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UNIVERSITY OF CALIFORNIA.

BIENNIAL REPORT

OF THE

PRESIDENT OF THE UNIVERSITY

ON BEHALF OF THE BOARD OF REGENTS,

TO

His Excellency the Governor of the State.

1882-84.



SACRAMENTO:

STATE OFFICE JAMES J. AYERS, SUPT. STATE PRINTING.

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REPORT.

To his Excellency GEORGE STONEMAN, *Governor of the State of California:*

In accordance with the requirement of Section 1432 of the Political Code, I have the honor of herewith submitting, in behalf of the Board of Regents of the University of California, the following biennial report upon the University for the academic years 1882-83 and 1883-84, namely: from August 1, 1882, to August 1, 1884.

I have included in the report such statistics of the present year, and of previous years, as seemed to me likely to throw light upon the present condition and prospects of the University.

Instruction.

The Board of Regents has organized the following named colleges and regular courses leading to a degree: At Berkeley, a College of Letters, a College of Agriculture, a College of Mechanics, a College of Mining, a College of Civil Engineering, a College of Chemistry, a Literary Course, and a Course in Letters and Political Science; in San Francisco, a College of Law, a College of Medicine, a College of Dentistry, and a College of Pharmacy. Besides these colleges and regular courses, the organic Act creating the University declares that "each college shall have a partial course for those who may not desire to pursue a full course therein; and any resident of California, of the age of fourteen years or upwards, of approved moral character, shall have the right to enter himself in the University as a student at large, and receive tuition in any branch or branches of instruction, at the time when the same are given in their regular course, on such terms as the Board of Regents may prescribe."

Faculties, and other Officers of Instruction.

The organic Act defines the Faculty of a college to be "the President and resident professors of the same."

In 1882-83 the Faculties of the colleges at Berkeley consisted of the President and eleven resident professors. There were connected with these Faculties three honorary professors, thirteen instructors, one assistant instructor, two lecturers, one assistant in chemistry, and one assistant in agricultural chemistry.

The Faculty of the Hastings College of the Law consisted of the President and three professors.

The Faculty of the Toland College of Medicine consisted of the President and eleven professors. There were connected with this Faculty one lecturer, and one demonstrator and assistant lecturer.

The Faculty of the College of Dentistry consisted of the President and seven professors. There were connected with this Faculty four demonstrators and nine clinical instructors.

The Faculty of the College of Pharmacy consisted of the President and four professors.

In 1883-84 the Faculties of the colleges at Berkeley consisted of the President and fourteen resident professors. There were connected with these Faculties three honorary professors, twelve instructors, one assistant instructor, one temporary instructor, two lecturers, one assistant in chemistry, one assistant in agricultural chemistry, and one superintendent of the machine shop.

The Faculty of the Hastings College of the Law consisted of the President, two professors, and the Dean.

The Faculty of the Toland College of Medicine consisted of the President and thirteen professors.

The Faculty of the College of Dentistry consisted of the President and seven professors. There were connected with this Faculty three demonstrators, two assistant demonstrators, and thirteen clinical instructors.

The Faculty of the College of Pharmacy consisted of the President and four professors.

Academic Senate.

The organic Act defines the Academic Senate to be "all the Faculties and instructors of the University." It further says of the Academic Senate that "every person engaged in instruction in the University, whether resident professors, non-resident professors, teachers, or instructors, shall have permission to participate in its discussions; but the right of voting shall be confined to the President and the resident and non-resident professors."

In 1882-83 the Academic Senate consisted of the President of the University, thirty-nine professors, twenty-two instructors, two assistant instructors, three lecturers, and five demonstrators.

In 1883-84 it consisted of the President, thirty-nine professors, the Dean of the Hastings College of the Law, twenty-five instructors, one assistant instructor, one temporary instructor, two lecturers, three demonstrators, and two assistant demonstrators.

There appear to be serious incongruities in the constitution of the Faculties and the Academic Senate. The most striking, perhaps, is the provision that admits an instructor to a seat with the Academic Senate and gives him a voice in its discussions, but does not accord him either a seat or a voice in the Faculty of the college in which he gives instruction. He is, in other words, given a seat and a hearing with the body to which he can be of little or no service, and deprived of a seat and a voice with the body with which he is associated in all his duties, and to which the information and the counsel that he could give would often be of the greatest value.

There are other incongruities more serious in their consequences, one of which is so marked as to deserve special attention.

It may be stated as a matter of history that for several years there were no professional colleges connected with the University, and the Faculties at Berkeley, therefore, constituted the Academic Senate. The duties they had long performed related entirely to the colleges at Berkeley, and as the addition of the affiliated colleges introduced no new questions into their deliberations, they still continued by common consent in the exercise of their accustomed powers. Indeed, these powers were so fitting, and so exactly coincided with the powers assigned to the Academic Senate, that it can hardly be doubted that

it was the intention of the framer of the Act simply to define the body composed of the joint Faculties at Berkeley. But whatever may have been his intention, the terms of the Act seem to include the Faculties of the affiliated colleges as members of the Senate, and later the Board of Regents so ruled.

The powers of the Academic Senate are defined as follows:

The Senate must conduct the general administration of the University, regulate the general and special courses of instruction, receive and determine all appeals from acts of discipline enforced by the Faculty of any college, and exercise such other powers as the Board of Regents may confer upon it.

A single illustration will make plain the impropriety of lodging some of the powers here enumerated with the joint Faculties of the Colleges of Letters and of Science at Berkeley, and of Law, Medicine, Dentistry, and Pharmacy in San Francisco. It is, for example, the duty of the Senate to regulate the general and special courses of study.

This duty imposes upon the Faculties of the undergraduate colleges at Berkeley the power to regulate, or to have a voice in regulating, the courses of instruction in the Colleges of Law, Medicine, Dentistry, and Pharmacy, and upon the Faculties of the Colleges of Law, Medicine, Dentistry, and Pharmacy the power to regulate or to take part in regulating the courses of instruction in the Colleges of Agriculture, Mechanics, Mining, Civil Engineering, Chemistry, and Letters, and in the Literary Course and the course in Letters and Political Science.

The propriety, on the other hand, of placing in the hands of the joint Faculties at Berkeley the power to regulate their several courses of study will be plain, if it be borne in mind that there are six undergraduate colleges and two undergraduate courses at Berkeley, and that most of the professors and instructors have duties in all, or in almost all, of them. It cannot, for example, be left to the College of Letters to call for two hours of Mathematics, to the College of Agriculture to call for three, to the College of Chemistry to call for four, or any other number, and to the remaining colleges and courses to call for such hours as the several Faculties would be glad to have, for it would be impossible for the department of Mathematics to meet these various demands. So of the other departments. If each college or course had a distinct corps of teachers, so that each could be independent of every other, instead of their being mutually interdependent as they are, the entire aspect of the case would be different.

The Faculties of these several colleges and courses must then meet as one body, and so coördinate and distribute the work that each college or course shall receive a due portion of the time that each professor or department can give.

And what has been said of the community of interest in the matter of adjusting the work of the several departments of instruction at Berkeley may also be said of many other matters, and yet the terms of the organic Act are such that the Board of Regents has felt compelled to decide that the Faculties at Berkeley cannot act as a joint body in these and other matters affecting in common and exclusively their own colleges. This unforeseen outcome has entailed extreme embarrassment upon the Faculties at Berkeley. To do much of the work that has heretofore been done in a simple and efficient way by a single meeting of the joint Faculties, it is now necessary, in order

to secure the uniformity of action that is absolutely essential to the harmonious working of interdependent colleges, to call the joint Faculties together for deliberation and to formulate a desirable line of conduct; and then to submit the result of these deliberations to the six several Faculties for their approval.

Many of the duties placed upon the Academic Senate are important duties, certainly, but they are not such as belong to an Academic Senate. That body has, or should have, the greater and more important function of determining matters of general university policy; of proposing measures which, while strengthening each individual department, shall yet contribute to the strengthening and building up of the University as a whole. It is not that there are likely to be antagonistic interests or friction in the conduct of work of the character described; but that it is detailed work which so important a body as the Academic Senate, properly so called, should not be called upon to do.

These difficulties would be reduced to a minimum if there were at Berkeley, as in my judgment there should be, simply a department or College of Letters, and a department or College of Science, with their appropriate courses; but, as the organic Act relating to the University was made a portion of the Constitution of the State, the only remedy that now appears to be possible seems to lie in a constitutional amendment that shall leave to the Board of Regents and the Academic Senate the details of college work and university development.

Meanwhile the work is being conducted as well as may be with the cumbrous machinery that must be set in motion to do it. A committee of the Academic Senate is attempting to devise some simpler method that may yet be in conformity with the law.

Enrollment of Students.

In the following table will be found a statement, year by year, of the number of students enrolled in the several undergraduate colleges and courses as full course students since the opening of the University, and also the number that have pursued irregular courses, not leading to a degree, namely: partial course students, including special students, and students at large:

TABLE I.

YEARS.	Classical.		Literary.		Letters and Political Science.		Agriculture		Mechanics.		Mining.		Civil Engineering.		Chemistry.		Unclassified, Scientific (Freshmen and Sophomores).		Partial, Special, and at Large.		Graduate Students.		Men	Women	Total	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women				
1869-70	28																33		21	8	3		85		8	93
1870-71	28																74	1	23	27			125	28	153	
1871-72	28	*															84	9	28	20			146	39	185	
1872-73	42	1	†														67	5	30	15	2		169	22	191	
1873-74	43						5	1					15		6		62	1	29	25	8	1	192	38	231	
1874-75	45	5									2		19		6		102		17	16	5		268	42	310	
1875-76	50	8	64	16			1		2		7		14	2	6		49		20	16	3		260	45	305	
1876-77	47	6	66	23			2		5		22		31		15		52	4	29	20	4		268	52	320	
1877-78	53	8	71	19			3		7		17		25		8		62	4	42	21	5		279	53	332	
1878-79	46	8	70	19			2		9		15		24		4	1	62	4	42	21	5		279	53	332	
1879-80	36	7	57	20			6		9		10		10		6	2	33	3	41	21	5	2	213	55	268	
1880-81	25	5	47	18			10		11		6		11		5	4	25		43	35			183	62	245	
1881-82	32	4	48	19			8		5	1	6		14		2	1	20	1	34	26	2	1	171	53	224	
1882-83	37	5	27	18	†	14	1	2			5		10	1	1		17	1	33	43			146	69	215	
1883-84	38	4	25	16			1				6		5		2	1	27		26	35	6		155	61	216	
1884-85	41	2	16	11			3		7		11		20		5	1			57	23	8		197	44	241	

* Until the close of 1872-73 students were classed as "Students in Letters" and "Students in Science."

† The "Literary" course was not recognized until 1874-75.

‡ The course in "Letters and Science," afterwards called the course in "Letters and Political Science," was authorized by the Board of Regents in 1881.

This table shows the interesting fact that the classical course very fairly holds its own in competition with an unusually liberal range of scientific and elective courses. The fact is interesting, in so far as it contributes to a knowledge of the drift of public sentiment with regard to classical education. Its significance is, however, likely to vary according to personal prepossessions or convictions. How much is due to the disinclination to break away from traditional lines of education, and how much to sober judgment, are unknown quantities that one may not safely estimate.

It will be observed that, up to the time of the establishment of the course in Letters and Political Science, the Literary course, in which Greek is not required, was the most fully attended course in the University. The decrease in the attendance upon this course was sudden and coincident with the establishment of the course in Letters and Political Science, and clearly indicates that the latter course draws its students principally from those who would otherwise be likely to take the Literary course. The course in Letters and Political Science has proved acceptable, but it has not shown that there was any great dissatisfaction with the courses already established.

Before speaking of the Colleges of Science attention should be drawn to the fact that under the head of unclassified scientific students are enumerated all the students in the Freshman and Sophomore classes who are preparing for one of the Colleges of Science, but have not yet made their choice. So, also, partial and special students and students at large are unclassified, because they are not pursuing regular courses although they generally have a preponderance of studies in some one college, and not infrequently complete the required studies of that college and take the proper degree. The distribution of these students among the several colleges, it may fairly be presumed, would somewhat increase their numbers without materially altering the proportions found in the table.

Agriculture.

Thus far the history of our Agricultural College has but added to the testimony, already ample, that the agricultural population of the country does not feel the necessity, not even the desirability, of farming in accordance with scientific principles. That farmers believe in Agricultural Colleges we must admit, for we have their frequent and earnest assertions to that effect, but we are compelled to think that they do not believe in them for their own sons, otherwise our Colleges of Agriculture would be filled with students instead of being substantially without them. The farmer might, indeed, with entire consistency, maintain his belief in Agricultural Colleges even though his own sons should not attend one. He might, with much force, urge that, with the practical side of farming, his sons are daily made familiar, and that he looks to our Agricultural Colleges for the results of investigations and experiments that can there be conducted more carefully and exhaustively, and so more conclusively than would be profitable or even possible on a private farm however complete the agricultural education of the farmer. That this view does not, however, prevail, seems clear from the fact that the complaints that are made are complaints, not that our Colleges of Agriculture are not doing the best of work, but that they are not well attended. The justification of these complaints does not then appear.

But however valuable agricultural education may be to the farmer,

experience seems to point quite conclusively to the probability that the chief value of agricultural colleges is to be found in the service they render as experiment stations. It is indeed quite true that if every farmer were a scientific agriculturist every farm might become an agricultural experiment station; but this would be an expenditure of energy and resources, if attempted on a scale likely to establish important facts, that the average farmer would not be at all warranted in undertaking. He must farm for profit, although he often gets little more than a comfortable living; and experimental farming is not profitable. It is cheaper for him to share in the support of experimental farms, conducted by expert investigators, than to attempt to make investigations on his own account; and the result so reached must have an authority that could not attach to results reached with inferior appliances, and by investigators with slight experience. And, again, however valuable might be the discoveries made by a farmer in his private investigations, the knowledge of them would probably for a long time be confined to his immediate neighbors, but with the ready means of communication between public experiment stations and farmers, through printed bulletins and the agricultural press, the discovery of to-day may be utilized by the progressive farmer to-morrow.

Acting on these beliefs, and on the fact that farmers will not send their sons to agricultural colleges, Professor Hilgard, without neglecting instruction, is making the work of investigation and experiment more and more the prominent features of the College of Agriculture. Analysis of soils, waters, wines, fertilizers, and other like analyses, that have long been the chief work of the laboratories of the agricultural departments, now promise to be supplemented by experiments in different parts of the State. The soil of the experimental grounds at the University is not good, and is in no sense a representative soil; neither is the climate suitable for the leading agricultural industries of the State. It is, therefore, impossible to conduct at Berkeley experiments in practical agriculture, the results of which could be widely accepted as conclusive.

An excellent beginning in this outside experimental work has been afforded by the liberality and coöperation of Mr. John T. Doyle, who has placed a suitable portion of his vineyard, near Santa Clara, at the disposal of the Regents for experimental purposes. Ample opportunities are here to be offered, under the same conditions, to test, among other things, the productiveness of vines under different systems of pruning, and with different fertilizers. The results arrived at are likely to be of great interest and value. The importance of systematizing and coördinating work of this kind, so that each State or section of country may profit by the investigations conducted in sections having similar soil and climate, so that the same experiment may not be many times multiplied to little purpose, seems likely to be recognized by the National Government in the establishment of coöperative experiment stations in all the States. Experiment station work seems then to be clearly the direction in which agricultural colleges are to prove their greatest value.

The nature and scope of many of the experiments that have been conducted in the laboratories of the College of Agriculture, are already quite well known through the bulletins that have, from time to time, been issued from that department, but the matter is of sufficient

importance to warrant something of a resumé of them in this connection.

Perhaps the most important agricultural question in California, is how to get an adequate supply of water suitable for irrigation purposes. Without this supply, large stretches of country must remain comparatively worthless. I say "an adequate supply of water suitable for irrigation purposes," for a series of experiments conducted at the University, have shown the fact—a fact of almost inestimable value—that much of the water in California is so fully charged with deleterious minerals as to be, not merely worthless, but highly injurious for irrigation purposes. In a single instance the analysis of an ample water supply proved its utter unfitness for irrigation purposes, and saved to the projectors of an extensive irrigation project the loss of several hundred thousand dollars, and to the owners of the land a still greater loss that would have resulted in the injury to the land if the water had been distributed upon it. The importance of this investigation has led to the analysis of several other most promising water supplies, some of which have shown, as in the case just cited, that the water was worse than worthless, while others have shown it to be of such a quality as to warrant whatever expense might be necessary to husband it with the utmost care. It has been shown that even artesian water may be unfit for irrigation purposes. I do not doubt that these investigations have of themselves, many times over, repaid the State all that has been expended upon the Agricultural Department of the University, besides preventing large and unprofitable expenditures in the future, by showing the important fact, that in many parts of the State no irrigation project should be undertaken, not even the development of an artesian well, without first knowing the constituents of the water that is to be utilized.

Analyses of soils from different parts of the State have resulted in similarly interesting and valuable discoveries. These analyses show the peculiar adaptability of certain soils to certain cultures, or the character of the fertilizers needed to maintain the culture to which a given soil has already been put.

And, again, the experiments that have been made on wine produced in different parts of the State promise little less than a revolution in our viticultural industry. Certain varieties of vines are found to be peculiarly suited to certain localities, and as ill suited to others. Some districts are found to yield wine rich in tannin, but deficient in acid, while in other districts the quantity of these constituents is reversed. And so of other qualities. These investigations and analyses must, at no distant day, result in so adapting vineyards to soils, and in such an accurate knowledge of the constituents of the wines of different localities, as to make it possible everywhere to grow to the best advantage, and out of the product to produce blends that may, perhaps, be superior to the unmixed product of any single district. The immediate practical value of these investigations is well demonstrated in the fact that planters are now, in some instances, withholding their plantings or their graftings with the purpose of being governed in their action by the results of experiments now in progress. And yet, notwithstanding the magnitude of the interests involved and the value of the results already attained, it would be difficult to plan a more inadequate viticultural outfit than the University viticultural laboratory and cellar—if, indeed, the terms laboratory and cellar may be applied to our viticultural quarters. The entire

building should be enlarged and remodeled, indeed, it should be replaced by an entirely new building adapted in all its appointments to the extended work that the viticultural department is called upon to do. But however inadequate the appointments of the laboratory and cellar the insufficiency of clerical and laboratory help is still greater. The salary paid to the assistants in the laboratory is hardly more than the wages of a day laborer, and yet the work has generally been continued beyond ordinary business hours and, as a rule, during holidays. The skill and experience that these young men have gained in the work has prepared them for more remunerative employment elsewhere. That which makes their services valuable elsewhere makes them peculiarly valuable to the University, and if not in recognition of past services, certainly in the interest of the University, appropriations should be made sufficient to retain them and get additional help.

The legislative appropriation of the last two years for agricultural purposes has been expended in these investigations and experiments, and in the introduction and distribution of new varieties of grasses, cereals, fruit and other trees, and in the diffusion of other information of interest and value to agriculturists. For details you are referred to the accompanying report of Professor Hilgard.

Mechanics.

The attendance upon the College of Mechanics seems to indicate either that there is not as yet felt to be any considerable demand among us for mechanical engineers—a profession to which the course in the College of Mechanics is introductory—or that the purpose of the course is little understood, and that students failing to find in it that which they expected, abandon their purpose of taking it in favor of another course that seems to promise a readier or a better career. It is, I think I may say, a very common opinion that it is the proper purpose of the course to make highly educated skilled mechanics, but at any rate, skilled mechanics, and because it fails to do this, it fails of its purpose. A short discussion of the subject seems therefore called for.

The cause of whatever misconception there is, is doubtless the failure to distinguish between the object of Technical and Industrial education. The training of the technical school is designed for those who wish to become engineers; that of the industrial school, for those who wish to become mechanics. The technical school is therefore a professional school, while the industrial school is a skilled labor school—an apprentice shop. The mechanical engineer determines what kind of machinery is best suited to accomplish a desired result, and makes the necessary plans and specifications for its construction and operation. The mechanic makes and places the machinery thus designed. The two callings touch and supplement each other but do not at all coincide. It would add something to the equipment of the mechanical engineer if he were a skilled mechanic, but it is not a necessary part of his equipment, any more than it is necessary that the architect should be able to frame the house that he plans, lay its foundation in masonry, lath, plaster, paint, and glaze it.

Why, then, it is asked, is a workshop connected with the College of Mechanics, furnished with tools and machinery sufficient to do a wide range of skilled work, if the student is not required, and not

even expected, to become skilled in the use of the tools and machinery? If the purpose of a technical school is kept clearly in mind, it will not be difficult to understand that the workshop is a laboratory, to be used, not for the purpose of familiarizing the student with the tools and processes of manufacture—not as an introduction to the machine shop—but to acquaint him more intimately with the principles of his profession, and render him expert in methods of investigation and experiment. In the class-room the student theorizes and plans; in the laboratory his theories and plans are, as far as possible, brought to the test. He there learns whether the machine that he has designed fulfills its purpose or fails of it, or what are its excellencies or defects. It is the corrective that practice puts upon theory. And yet, although this is the first and the main use of the workshop, and although skill in the use of tools is not a necessary part of the education of a mechanical engineer, it yet seems to me highly desirable that there should be connected with every College of Mechanics a workshop sufficiently ample and well equipped to offer every facility to such students as have mechanical tastes and mechanical ingenuity, as well as scientific tastes and ability, to attain to whatever skill they may wish in handicraft. I cannot doubt that work in the shop, when undertaken because of a love for it, reacts most favorably upon the studies of the class-room. It is not merely a recreation, but a positive intellectual stimulus and aid. And yet, shop work should not only not be allowed to interfere with the prescribed work of the college, but the privilege of the shop should be open only to those who attain proficiency in the work of the class-room. If the student's tastes are in the direction of skilled manual work, and if he has mechanical ingenuity, he should attend a school whose object it is to make skilled mechanics. In this connection it is, perhaps, proper to say that it is to be greatly regretted that we have not such a school—indeed, such schools—on this coast; and I may add my belief that the multiplication of industrial or mechanical schools throughout the country would tend, as nothing else will do, to dignify labor, promote the well-being of our people, and advance our mechanical industries.

In 1883 a series of experiments were made with a partial turbine or tangential wheel, and also with hurdy-gurdy wheels. The experiments with the tangential wheel were conducted by the class in mechanics, under the direction of Professor Hesse and Instructor Browne; those with hurdy-gurdy wheels were conducted by Mr. Browne. The results of these experiments appeared in June, 1883, as Bulletin No. I of the College of Mechanics, and form a contribution to the literature of the subject of which they treat. It is the purpose of the college to publish other bulletins, giving the results of experiments that are conducted in the laboratory. Last year, two students evidenced interest and skill in the use of tools, and were accorded opportunities in the workshop to exercise their skill.

Mining.

It is hardly surprising, perhaps, that the largest attendance upon the College of Mining immediately followed the great mining developments on the Comstock. An examination of the table would even seem to warrant the belief that the entire University temporarily profited by that development, and later felt the depression that followed the reaction. To students in mining, certainly, most promising careers seemed to many at that time to be opening, and a greater number of

young men sought to avail themselves of the opportunities offered in the College of Mining than presented themselves before or than have presented themselves since. Judgments formed during the excitement and over confidence attending such rich developments, as well as those that followed the rapid working out of bodies of ore that were thought to be all but inexhaustible, were doubtless, in many cases, hasty. The substantial working out of the great Comstock ledge was not infrequently taken as indicating the decay, if not indeed the collapse, of mining industries in California. Indeed, this belief seems still to be a common belief. It seems, therefore, to have been assumed, as a matter of course, that there was likely to be but little opportunity for the mining engineer or the metallurgist. Quite the opposite conclusion would perhaps have been the more legitimate. The discovery of a large ore deposit, and of economical methods of working it, does not necessarily create a great demand for mining engineers and metallurgists. They are most needed after the rich and easily worked ores have been exhausted, and when the problem of profitably working low grade or rebellious ores is to be solved; and when, also, expert judgments are needed to determine whether certain ore indications warrant the expenditure of considerable sums of money in testing the indications. New and valuable mining deposits doubtless await development, both in the United States and in Mexico, properties that in the development and working will require the constant service of the most competent engineers. It is probable, then, that there never was a time when the prospect for a mining engineer or a metallurgist was better than to-day. It can hardly be doubted that better and more economical methods of working low grade and rebellious ores will yet be discovered, and certainly no more creditable or inviting work could be desired by a student of mining or an expert metallurgist. For such work excellent facilities are offered in the well equipped laboratory of the Mining Department. To the equipment already in use important additions will soon be made, in a new building and additional machinery.

The laboratory practice of the last two years has consisted, in great part, in approved methods of assaying lead, gold, silver, antimony, copper, tin, nickel, cobalt, iron, and fuels. In this laboratory work, the students have, as far as possible, taken part.

Civil Engineering.

The attendance upon the College of Civil Engineering has always been fairly satisfactory—quite as large, perhaps, as was warranted by the public demand for engineers. It has, somehow, long been felt that civil engineering opened up a certain avenue to agreeable and remunerative work. This idea was doubtless the result of the demand for engineers begun by war and afterwards sustained by the enormous railroad development that culminated in 1872. This extraordinary development in railroad building created undue expectation with regard to the demand for civil engineers, and a consequent over supply of them. The falling off in the attendance upon the course in engineering, therefore, seems not only natural, but in the main justified by the outlook, although graduates of this department have, as a rule, been reasonably successful in obtaining employment in their line of work.

It is the purpose of the college to give to the student, not only the necessary theoretical knowledge to enable him, if he is a man of

resources, to undertake the solution of difficult engineering problems, but such practical knowledge as will enable him to direct the work in detail.

To the resources of the Department of Civil Engineering and Astronomy, an astronomical observatory is soon to be added. Prof. Soulé has indicated the following as the main uses to which the observatory is to be put:

"The foremost object will be to enable students, by means of the apparatus therein, to gain a practical knowledge and proficiency in the application of the principles underlying the more utilitarian portions of the science of astronomy: in other words, to employ the astronomical instruments, in connection with theoretical instruction in the lecture room, to supplement by trial the laws and rules developed in the latter; just as surveying instruments are employed in the field to elucidate and familiarize the principles of surveying brought out in class. A secondary use will be, to stimulate in students the desire to prosecute original studies, such as of the lunar, solar, and planetary surfaces and surroundings; and to this end I have devoted a fine equatorial telescope, six and one eighth inches aperture, and an excellent solar-stellar spectro-scope, for analyzing the light of sun and stars—a most enchanting field, even by itself. The more practical exercises will consist in determining the errors of construction and adjustment in each instrument, as compared with theoretical perfection, and in applying the proper corrections to render observations practically faultless; to read, simultaneously, the sidereal clock and mean time chronometer and compare them, one with the other; to observe, by means of star transits, sidereal time; and thus to determine the error and the rate of the clock; to do the same for the mean time chronometer by observations on the sun; to determine the latitude of the instrument by star transits, near the zenith, or by other methods; to determine the longitude of the observatory by electric correspondence with other observatories, as that at Mount Hamilton, in connection with transits of stars, by lunar culminations, etc.; and to practically solve other problems of use to the surveyor, geodesist, and navigator. To such students as desire to follow the profession of the astronomer, it will be open for practice in the above, and other elementary operations necessarily preceding a higher course of instruction, such as might be given at Mount Hamilton."

It is estimated that the \$5,000 appropriated at the last regular session of the Legislature for building and equipping an observatory, will be substantially exhausted in the purchase of the necessary instruments, and that an additional appropriation of \$5,000 will be necessary to complete the building, and prepare it and the instruments for use. The chief instruments that have been recommended for purchase are, a telescope, a mean time chronometer, a sidereal clock, and a Davidson combination transit and zenith instrument.

The department is very much in need of additional surveying instruments. It is estimated that \$2,500 will be necessary to put our stock in proper order.

Chemistry.

It will be seen that the attendance upon the College of Chemistry has not been large and has not greatly varied. It is to be regretted that the laboratories of this college are not available to students in the Colleges of Medicine, Pharmacy, and Dentistry. As heretofore, the laboratories are open during the entire day, and students are at liberty to spend all the time not devoted to other college exercises in the line of work best suited to their objects in life. The rooms occupied by this department are badly ventilated and incapable of proper ventilation except at an expense that would not be warranted. They are otherwise so unsatisfactory for chemical laboratory purposes, and so desirable for other college purposes, that a separate building should be provided for the College of Chemistry. For such a building the Professor of Chemistry has prepared suitable plans—the result of long experience.

Irregular Students.

It may well be that for lack of time or because of special tastes and special aptitudes or for a special purpose, a student may wish to devote whatever time he may have to some one study or group of studies. He may, for example, wish to make a special study of the English language and literature, or mathematics, or surveying, or chemistry, or any other subject or group of subjects in which instruction is given in the University, to fit him to teach or otherwise make use of his attainments. There can be no question, I presume, that there should be some institution at which a student with proper qualifications may enjoy such privileges, and it would hardly seem to admit of question that he should look to a great University for them. The desirability of thus extending the privileges of college instruction is being conceded in some of the best colleges in the country and seems likely to become a settled educational principle. It seems to have been the purpose of the framers of that part of the organic Act, which relates to partial courses, to secure to the fullest extent such opportunities at the University of California. It is, however, easy to carry the principle too far. If, for example, it should become understood that applicants of immature age and limited attainments may be admitted to such courses, the effect must inevitably be to lower the standard of admission to the University and demoralize the preparatory schools. If an easy way should be made to gain a foothold in the University, it would be natural for applicants to seek to enter by that easy way. It has heretofore been thought to be a sufficient safeguard against the abuse of the partial course privilege, and it has, therefore, been the policy of the several Faculties, to admit an applicant as a partial course student, in English or Latin, or surveying, or in any other subject, provided he could pass such an examination as would satisfy the instructor, whose course he wished to take, that his preliminary education in that branch of study was sufficient to enable him profitably to pursue the subject in the University. Experience seems, however, to show that an examination of this character is not a sufficient guarantee of the applicant's fitness for the work he purposes undertaking, and not a sufficient protection to the University against unworthy applicants, and I have little doubt, therefore, that the several Faculties will adopt some common standard of examination which all applicants for a partial course must pass in addition to the special examination that will be required in the subject to be continued in the University.

There is, however, a class of partial course students, known as special students, for which exceptions may be very properly made. It not infrequently happens that young men, from twenty to twenty-seven years of age, who have been engaged in surveying, or in teaching, or in some occupation in which they have felt the need of more advanced instruction than they have been able to obtain, come to the University to mend their early deficiencies. They generally have limited means, limited time, and wish to pursue a single branch of study together with such correlated branches as bear most directly upon the main subject. Such students are always earnest in their purpose, faithful in their efforts, and in every way highly desirable, and every privilege of the University by which they may profit should be freely thrown open to them.

There are yet other special students to whom, and to whom alone, the name of University student properly belongs—graduate students

or others who are already well advanced in attainments, and who wish to pursue some study and its correlated branches beyond the limits of the ordinary college course. It is in the highest degree desirable that students of such attainments and aims should take up their residence at our colleges and universities. Their presence is a stimulus to higher aims upon the entire student body. The body of special students is always likely to be small.

It must, therefore, be cause of general regret that the provisions of that portion of the organic Act which relates to military drill are found, in the judgment of the Board of Regents, to be such that while military drill may be taken alone, no other study or studies of whatever grade may be taken without it, and that these provisions are so stringent in their terms as to override that other portion of the Act before quoted, which seems to have been intended to invite to the University this highly desirable class of students.

Military Drill.

During the last year more prominence has been given to military drill than for some years previous, and as a consequence there has been an increase in interest in the drill and in its efficiency.

Physical Laboratory.

The following abstract from the forthcoming Register, gives a sufficiently minute statement regarding the Physical Laboratory:

During the past year most of the apparatus purchased with the legislative appropriation of five thousand five hundred dollars, has been received and made available for use. The laboratory has been fitted with many conveniences for work, and now offers good facilities to students who wish to pursue the study of Physics beyond the limits of the prescribed courses, whether in connection with special work, such as electrical engineering or crystallography, or in the study of physics itself. Such students can make special arrangements for the use of the laboratory.

There is great need of additional apparatus for use in connection with the lectures on general physics. Most of the apparatus now in use was bought fifteen years ago and was even then incomplete and imperfect. Since that time new instruments for the more exact determination of physical laws have been invented, so superior in every way as to make most of the old of comparatively slight value. It is also extremely desirable that the whole department of Physics should be brought into the same building, so that its entire facilities may at any time be readily accessible to the professor and instructor for purposes of instruction and illustration. It is important, too, that apparatus of the value of that desired for the department should be better protected against the risks of fire than is possible in North Hall. The rooms most suitable in all respects for the department, are those now occupied by the physical laboratory and the department of Chemistry in South Hall. And as these rooms are in many respects unsatisfactory for chemical laboratory purposes, the plan that suggests itself as most desirable is to provide a separate building for the College of Chemistry, as was before suggested, and leave to the department of Physics the rooms thus vacated.

Museum Building.

Other departments are in equal, indeed, in even more pressing need of suitable accommodations, and no department more than that of

Natural History. The vast extent of the field to be covered by the natural sciences, the brilliant discoveries that have been made in every part of it, and the great popular interest that has been aroused by them, have all led to great specialization and to greatly improved methods and facilities for imparting instruction. And among the most important of these improved facilities natural history collections stand first. We are all more or less familiar with the larger or smaller collection of curiosities called a museum connected with most of the colleges of twenty or thirty years ago, in which minerals, butterflies, fossils, stuffed birds, and shells were promiscuously arranged, more with a view to artistic effect than according to any known laws of scientific classification. This promiscuous collection was usually committed to a Curator, whose main duty was to exhibit it to the casual visitor of the museum.

All this is now changed. With specialization in the sciences has also come specialization in collections. Instead of general collections of curiosities our colleges and universities now seek to make carefully classified collections, or museums, of mineralogy, botany, agriculture, biology, with its numerous subdivisions, paleontology, historical geology, etc., each of which shall be in the immediate charge of a specialist for purposes of instruction and research.

The use of the collections for the purpose of gratifying public interest, or public curiosity, may not be disregarded, and for this work there must needs be a general Curator, who, without pretending to be a specialist in more than perhaps a single department, which then would be the subject of his special care, may yet have such a general knowledge of the entire collection as will enable him to conduct visitors through them with proper intelligence. If, then, these are the legitimate objects of natural history collections, which I think no one will call in question, it is important that the University Museum should have a suitable building, and be as rapidly developed as possible in its several departments. The larger the collections, the more extensive the comparisons that may be made, and the more reliable the conclusions reached. In this State there are many local problems in mineralogy, geology, botany, and entomology to be solved; problems of great interest to miners, farmers, fruit growers, and manufacturers. In the solution of these and kindred problems, the University, through its scientific Faculties, may rightfully be expected to give great assistance, but only in case proper collections are provided. Many instances could be cited in which valuable assistance has been rendered in the directions indicated, and many could also be cited of inability to give the desired assistance through want of sufficiently large collections.

Indeed, no special instruction can be given in any department of natural science without a collection of the objects with which that science deals, and to give adequate instruction in any natural science taxes the resources of the largest collections.

It is, therefore, highly desirable that some organized effort should be made that shall insure the steady growth of our collections. Thus far, starting with the collection of the Geological Survey as a nucleus, they have been dependent entirely upon the good will and generosity of friends. Our collections have much California material that is greatly desired by eastern and foreign institutions, and that might be exchanged with great advantage to us, but lack of funds has thus far made it impossible to enrich our museum by this means.

But the systematic development that has been thus outlined calls for a special museum building. For the purpose of devising some suitable plan that should meet the demands of the several departments of Natural History and be ready for future reference, a meeting of the members of the Faculties immediately interested was called some months ago, at which it was agreed that the immediate needs could be well met by the construction of a north and south wing to the Bacon Library and Art building, in accordance with what is understood to have been the original design for that building. The discussion resulted in the further conclusion that it would be well to devote one wing to the collections, laboratories, work-rooms, and lecture-rooms of the Departments of Geology and Mineralogy, and the other to the Departments of Agriculture and Biology. Subsequently, detailed plans of the two wings were prepared and indorsed by these same gentlemen. In the preparation of these plans the best expert advice in the East was obtained relative to the biological rooms, the Department of Biology proper being as yet unrepresented in the University.

The main feature of the plan thus informally discussed is the grouping of all of these collections in the upper or art gallery floor, so that commencing for example at the farthest extremity of the north wing, a visitor would pass through a continuous succession of rooms, each devoted to a single scientifically arranged collection, then through the art gallery into the south wing, where a like arrangement of collections would be found.

It will be seen that this plan would bring all the collections of the University, including that of the fine arts, upon a single floor and in direct connection, without in any way sacrificing the independence or usefulness of the collections for their main object, namely, instruction.

The first, or library, floor is designed for the laboratories, work-rooms, and lecture-rooms, each set being directly under and in connection with its corresponding museum above, so that classes could be readily taken to and from the lecture-room and the collections above. While this plan has in it much to commend, it is still not the best plan. Leaving out of consideration the question of architectural fitness, it does not make adequate provision for the growth that should be expected in the Department of Natural History in a great University.

Mineralogy.

The appropriation for this department, made by the Legislature of 1880-81, is practically exhausted. The bulk of it was expended in the purchase of cases for the museums of mineralogy, petrography, and economic geology, for microscopes, and for instruments for the goniometrical and optical investigation of minerals. A small portion of the original appropriation was reserved for the current minor needs of the department.

No money whatever has been available even for the purchase of specimens of important minerals and rocks not represented in the collections.

One of the greatest needs of the department is a collection of wooden models of crystals. If it were not for the generosity of two private individuals who have loaned their collections, instruction in one important branch of mineralogy would be practically impossible.

A suitable collection of models could be obtained for \$500. Still the equipment is sufficiently full to enable the head of the department to begin the investigation of the rocks and minerals of the State. This is a work important in itself and important to many industries of the State, and sufficient funds should be provided to continue it with the activity and thoroughness that characterize the work of the Agricultural department.

Letters of inquiry from individuals relative to the economic value of accompanying specimens, and from educational institutions desiring assistance in the determination of their collections, are constantly received from all parts of the coast, and indicate, to some extent, the demand there is for such an extension of the work as is here proposed.

For the development to which the department looks, such accommodations are needed as were suggested in the plan for a museum building.

Mills' Chair of Philosophy.

The University and the public are to be congratulated upon the satisfactory filling of the Mills' Chair of Intellectual and Moral Philosophy and Civil Polity, by the election of Geo. H. Howison, L.L.D., as Professor. The appointment was delayed in accordance with the recommendation of Mr. Mills, for reasons that commended themselves to the Board of Regents.

The purpose and scope of the instruction to be given from this chair will be best indicated by the following announcement of the course of study recently made by Professor Howison:

UNDERGRADUATE COURSES.

A.—PERMANENT.

I. THEORETICAL PHILOSOPHY.

I. *Propædæutic to Philosophy.* The Logic underlying Grammar: Familiarization of the Common Categories by their use in the Analysis of Propositions and Terms. *Once a week throughout the Sophomore year.* Open to all students in Sophomore standing.

II. *Introduction to Philosophy.* Empirical Psychology, including Formal Logic, deductive and inductive; General History of Philosophy. *Three times a week throughout the Junior year.* Open to students who have completed Course I.

II. PRACTICAL PHILOSOPHY.

III. *Elementary Ethics, historically treated.* Including a critique of Perfectionism and Hedonism, of Necessity and Freedom, and of Optimism and Pessimism. *Twice a week during the First Term of the Senior year.* Open to students who have completed Course II.

IV. *Elements of Civil Polity.* The Nature of a State and its Bearing on the Limits of Allegiance and Liberty; including the History of Political Theories. *Twice a week during the Second Term of the Senior year.* Open to students who have completed Course III.

B.—ALTERNATING.

Two to be given each Term.

I. THEORETICAL PHILOSOPHY.

V. *Descartes and Spinoza:* Dualism and Monism. *Twice a week during the First Term.* Open to students who have completed Course II.

VI. *Spinoza and Leibnitz:* Pantheism and Monadism, or Universalism and Individualism. *Twice a week during the Second Term.* Open to students who have completed Course V.

VII. *Leibnitz and Locke:* Rationalism and Empiricism. *Twice a week during the First Term.* Open to students who have completed Course II.

VIII. *Hume and Kant:* Development of the Scepticism latent in both Empiricism and Rationalism; Critique of the Foundations of Agnosticism. *Twice a week during the Second Term.* Open to students who have completed Course VII.

IX. *The Ancient Development of Idealism: Socrates, Plato, Aristotle.* Twice a week during the First Term. Open to students who have completed Course II.

X. *The Modern Development of Idealism: Berkeley, Hume, Kant; Fichte, Schelling, Hegel.* Twice a week during the Second Term. Open to students who have completed Course IX.

XI. *The Philosophy of Evolution, partial and complete: Darwin and Spencer; Aristotle, Leibnitz, and Hegel.* Twice a week during the First Term. Open to qualified students of Physics and Biology who have completed Course II.

XII. *The Philosophy of Science.* The Principle and the Necessary Limits of Natural Science, including the Scope and Exact Function of the Laws of Causality, Correlation, and Natural Selection: with a critique of Du Bois-Reymond's *Grenzen des Naturerkenntens* and Heinholtz's *Ursprung und Bedeutung der geometrischen Axiomen.* Twice a week during the Second Term. Open to qualified students of Mathematics, Physics, and Biology, who have completed Course II.

XIII. *Real Logic: Theory of Reason as the Principle of Truth and Existence.* Induction and Dialectic: Mill, Bain, Jevons; Everett, Fichte, Hegel. Twice a week during the First Term. Open to students who have completed Course II.

II. PRACTICAL PHILOSOPHY.

XIV. *Higher Ethics: the Problem of Free Will.* Critical establishment of the Ground of Moral Obligation and of the Supreme Principle of Moral Action. Twice a week during the Second Term. Open to students who have completed Course III.

XV. *Higher Ethics: the Problem of Evil.* History and Criticism of Optimism and Pessimism. Twice a week during the Second Term. Open to students who have completed Course III.

XVI. *Higher Civil Policy: the Philosophy of Rights.* Plato and Aristotle: and Modern Theorists from Grotius to Mill. Twice a week during the First Term. Open to students who have completed Course II.

XVII. *The Philosophy of History.* Comte, Hartmann, Duehring; Herder, Schelling, Schlegel; Vico, Hegel. Twice a week during the First Term. Open to students who have completed Course II.

XVIII. *Philosophy of Religion, historically considered.* God, Duty, and Immortality, as treated by the leaders of philosophy from Anaxagoras to Lange. Twice a week during the First Term. Open to students who have completed Course II.

XIX. *Philosophy of Religion: the Rational Foundations of Theism.* Critique of Mill's *Three Essays* and Kant's *Dialectic of Pure Reason.* Twice a week during the Second Term. Open to students who have completed Course XVIII.

XX. *Philosophy of Religion: Comparative Religions and the Evidence of Christianity.* Test of the Finality of the Christian Religion in the light of the Evolution of Religion. Twice a week during the Second Term. Open to students who have completed Course III.

GRADUATE COURSES.

Studies of Master-works in the original: one to be conducted each term.

XXI. *Plato.* The *Parmenides*, *Theætetus*, and *Sophist.* Twice a week during the First Term.

XXII. *Hegel.* The *Phänomenologie des Geistes.* Twice a week during the Second Term.

XXIII. *Kant.* The *Kritik der reinen Vernunft.* Three times a week during the First Term.

XXIV. *Hegel.* The *Wissenschaft der Logik* and the First Part of the *Encyclopædie der philosophischen Wissenschaften.* Three times a week during the Second Term.

XXV. *Aristotle.* The *De Anima.* Twice a week during the First Term.

XXVI. *Aristotle.* The *Metaphysics.* Books I, XIII; III-V; VII-IX; and XII. Twice a week during the Second Term.

XXVII. *Aristotle.* The *Politics.* Three times a week during the First Term.

XXVIII. *Hegel.* *Philosophie des Rechts.* Three times a week during the Second Term.

XXIX. *Kant.* The *Grundlegung zur Metaphysik der Sitten* and the *Kritik der praktischen Vernunft.* Twice a week during the First Term.

XXX. *Kant.* The *Kritik der Urtheilskraft.* Twice a week during the Second Term.

Course in Pure Mathematics.

The Professor of Mathematics intends in the near future to propose a course in pure mathematics, leading to the Bachelor's Degree, in order to meet the wants of the following classes of students:

(1) Those who, intending to make mathematical research their special vocation, wish to continue their mathematical studies after graduation, whether here, or in one of the Universities of Europe, or of the Atlantic States.

(2) Those who wish to equip themselves as teachers of mathematics.

(3) Those who, intending to make physical research (theoretical or practical) their chief occupation, wish a thorough mathematical preparation.

(4) Those who, intending to become mechanical, mining, civil, or marine engineers, wish a more thorough mathematical training than is possible in the short time allotted to mathematical study in the *regular* undergraduate courses in the engineering departments.

It is proposed to make the course sufficiently thorough to enable the student, without further preparation, to attend with profit such lecture courses as are now offered at Baltimore, or any of the European Universities.

The following is an outline of the studies which it would be possible, with our present resources, to incorporate into such a course:

Prescribed Mathematical Studies.

1. Differential and Integral Calculus, four exercises a week, two terms.
2. Analytical Geometry, one exercise a week, four terms.
3. Determinants and Theory of Equations, two exercises a week, two terms.
4. Differential Equations, three exercises a week, one term.
5. Analytical Geometry of Space, or } three exercises a week, one term.
6. Functions of Complex Variables, }
7. Analytical Mechanics, four exercises a week, two terms.
8. Physics, three exercises a week, two terms.
9. Physical Laboratory, three exercises a week, three terms.

Other Prescribed Studies.

1. English, four exercises a week, two terms.
2. Twenty themes.
3. German or French, four exercises a week, four terms.

Of Mathematical Elective Work.

Six exercises a week during the first term, and three during the second term of the third year, and six during both terms of the fourth year, the choice to be made from the following subjects:

GEOMETRY.

1. Modern Synthetic Geometry.
2. Analytical Geometry of Space.
3. Higher Plane Curves.
4. Non Euclidean Geometry.
5. Quaternions.

ALGEBRA AND ANALYSIS.

6. Modern Higher Algebra (Homogeneous Forms, Invariants, Covariants, etc.)
7. Theory of Substitutions and of Algebraic Equations.
8. Applications of Calculus to the Geometry of Curves and Surfaces.
9. Functions of Complex Variables.
10. Theory of Elliptic Functions.
11. Riemann's Theory.
12. Calculus of Variations.
13. Partial Differential Equations.
14. Theory of Quaternion Functions.
15. Theory of Numbers.

Of other Elective Work.

Four exercises a week during the first year, three during the second, and six during the third and fourth years, the choice to be made in any of the studies taught in the colleges at Berkeley.

With our present teaching force, the full number of exercises per week here indicated could not be provided for, but the mathematical work of the Senior year will be conducted mainly without recitations or lectures. The student will be required to master certain assigned subjects, and will be directed to the original sources for his information, and his progress will from time to time be tested by examination.

Students who complete the course by electing the Latin and Greek prescribed in the first two years of the classical course, would be eli-

gible to the degree of Bachelor of Arts; other graduates of the course would naturally receive the degree of Bachelor of Science.

The course is in the line of University development, and, if adopted by the Academic Senate, will deserve every encouragement at the hands of the Board of Regents.

English.

It is not necessary that I should speak in detail of the work of the different Chairs in the University, but I conceive the work in English to be so important as to warrant some special mention. I am free to say, that I consider the study of English to be the most important study, not only in our secondary schools, but in the University. I am, therefore, glad to feel that we may fairly claim to be giving to the subject its proper recognition, and that we may willingly invite attention to the course of study offered.

The requirements of the department have, indeed, at times severely taxed the students, and have sometimes been thought too severe. The work has, however, been reasonably well done, and the results that have followed have been highly satisfactory.

It is believed, that with the better preparation that has already begun to appear in the preparatory schools, the work required at the University will not be found too difficult.

But whether too difficult under present conditions or not, it is certainly not more than should be comprised in a properly devised college course. If, however, the work has taxed the students, it has yet more taxed the instructors. The class-room work is but a small fraction of the work to be done in this department, and it is altogether the least laborious and wearing. Work in English cannot be satisfactorily done without much and careful theme work, and no one who has not had experience can know how exhausting it is to correct, day after day and week after week, even the most carefully prepared papers.

It is quite impossible for a professor and one instructor to do the work laid out in this department. For the last two years, the partial service of an assistant in English has been secured in correcting themes. This should be made a permanent position, and should be advanced to that of a full instructorship. I am confident that it cannot be necessary to urge the importance of strengthening this department at the earliest possible moment that our finances will permit.

German.

The professor of German has a larger attendance upon his exercises than any other instructor in the University, with the exception of the Professor of Military Science. In order to give to his several classes the time that is allotted to them in the several colleges and courses, he is compelled to make larger divisions than are felt to be advantageous. Many of them should be halved. This, however, cannot be done without the assistance of an instructor.

Botany.

The importance of providing instruction in Botany is known to the Board and fully appreciated by it, but want of means makes the appointment of an instructor at present out of the question.

Drawing.

So also the importance of strengthening the department of drawing so that all students who choose may leave the University with sufficient skill to fit them to take employment at once in the draughting room, has been carefully considered, and is fully recognized in a resolution of the Board authorizing the employment of suitable assistance, but here again the Board was compelled to defer action for the want of funds.

Pedagogics.

The importance of Pedagogics as a department of University work is tardily receiving proper recognition in some of the best Universities in the East. I regret that the University of California cannot be among the first to undertake this important work. I can only hope, by now drawing attention to the subject, to bespeak for it proper recognition as soon as the finances of the Board will permit.

Entomology.

There is probably no subject in which expert knowledge and expert teaching are more needed in the State than in entomology. Indeed, its importance is such that the State may confidently be expected to make proper provision for a Chair of Entomology in the University.

Library and Art Gallery.

There were twenty-five thousand nine hundred and seven bound volumes and five thousand two hundred pamphlets in the library August 1, 1884. Four thousand three hundred and twenty-six volumes have been added to the library during the two last years, mostly, as heretofore, books of reference. There were also added eleven hundred and ninety-eight pamphlets. The income from the Reese Fund, amounting still to \$3,000 a year, is the only income upon which the library may depend. This is hardly more than enough to supply its barest needs. Up to this time there has been no Chair of Philosophy in the University, and as a consequence, the Department of Philosophy has received little attention in library purchases. The filling of the Mills' Chair of Philosophy, therefore, makes necessary a special appropriation from the library fund, and so far limits the usual range of purchases in other departments. This fact, and the importance of adding to the library more rapidly than is possible with the current income, are certainly sufficient grounds for the recommendation on the part of the Library Committee and the Board of a special appropriation of \$10,000 for library purposes.

The Art Gallery is indebted to Mr. Charles Mayne for two very beautiful and very valuable oil paintings—the joint work of J. B. Klombeck and Eugene Verbockhoven.

Admission Examinations.

The requirements for admission to the several colleges have not been materially altered during the period covered by this report. They are essentially the same as those of the best colleges in the East. The following table contains a comparative statement of the requirements for admission in 1875, 1880, and 1884, compiled from the three Registers of those years. The more detailed statements were in some

cases inserted in the last Register for the benefit of teachers and school boards contemplating the establishment of schools, and of courses directly preparatory to the University, and in order that no ambiguity might arise concerning what is expected of candidates who present themselves for examination:

REQUIREMENTS FOR ADMISSION TO ANY ONE OF THE COLLEGES OF SCIENCE.

1875.	1880.	1884.
ENGLISH GRAMMAR.	ENGLISH GRAMMAR. RHETORIC.	<p>1. ENGLISH. Candidates will be required to write a short composition, correct in spelling, punctuation, grammar, and division into paragraphs, upon a subject announced at the time of the examination. They will also be required to analyze sentences from the works used in preparation, and to pass an examination on Kellogg's Text-Book on Rhetoric as far as Lesson 72.</p> <p>For 1884 and 1885 the subjects will be taken from the following works: Tom Brown's School Days at Rugby; Irving's Sketch Book; Dickens' Christmas Stories; Scott's Lady of the Lake and Kenilworth; Shakespeare's Merchant of Venice and Julius Caesar.</p> <p>14. ENGLISH. The examination in English will presuppose thorough study of the selections named below. The candidate should be prepared to elucidate in full the meaning of any passage in the works assigned; to paraphrase such a passage; to point out the rhetorical figures in it; to answer questions concerning the lives of the authors, and the subject-matter and structure of the works studied. The history of words should also receive attention; Skeat's Etymological Dictionary being taken as the authority. For the present, the examination in word-derivation will be limited to Spenser's Prothalamion.</p> <p>The examination will extend over two periods of an hour and a half each. Signal failure in this examination alone will subject the applicant to exclusion from the Course in Letters and Political Science.</p> <p>The examination in 1884 will be upon the following selections: American Prose; American Poems; Sir Roger de Coverley; Milton's L'Allegro and Il Penseroso; Byron's Prisoner of Chillon; Goldsmith's Deserted Village and Traveler; Burns' Cotter's Saturday Night; Scott's Lay of the Last Minstrel; Bacon's Essays of Truth, of Revenge, of Envy, of Boldness, of Travel, of Riches, and of Studies; and Macaulay's Essay on the Pilgrim's Progress.</p>
ARITHMETIC. Higher Arithmetic in all its branches, including extraction of square and cube roots, and the metric system of weights and measures.	ARITHMETIC. Higher Arithmetic in all its branches, including extraction of square and cube roots, and the metric system of weights and measures.	2. ARITHMETIC. Prime and composite numbers; divisibility of numbers; factors, multiplication and division by factors; common divisors, multiples; fractions; decimals, including percentage, simple and compound interest, and discount; compound numbers and the metric system; involution, square root. The technical parts of Commercial Arithmetic—such as banking, profit and loss, commission, taxes, duties, stocks, insurance, exchange, average of payments—may be omitted.
ALGEBRA. To Quadratic Equations.	ALGEBRA. Through Quadratic Equations.	<p>3. ALGEBRA (a). The definitions and explanations of the laws of signs in the four fundamental operations; theory of division of polynomials; factoring; highest common factor and lowest common multiple; fractions; simple and fractional equations; definition of the roots of an equation; simultaneous equations of the first degree; elimination by comparison, by substitution, and by addition or subtraction; inequalities; involution and evolution; fractional and negative exponents; radical expressions and surds; reduction and rationalization of surds.</p> <p>(b). The theory and solution of quadratic equations; solution of equations which may be reduced to the quadratic form; resolution of quadratic equations by inspection and by factoring; formation of equations having given roots; character of imaginary roots of an equation; reduction of irrational equations to the normal quadratic form; solution of simultaneous quadratic equations; problems.</p>

REQUIREMENTS FOR ADMISSION TO ANY ONE OF THE COLLEGES OF SCIENCE—Continued.

GEOMETRY. First four books.	GEOMETRY. Nine books of Davies' Legendre.	4. PLANE GEOMETRY (a). Logical basis of geometry in its axioms and definitions; relations of angles and of triangles; equal figures; parallels and parallelograms; properties of polygons; properties of the circle; inscribed and circumscribed figures; areas of rectangles and of plane figures; ratio and proportion; linear proportion, and proportion of areas; similar figures. (b). Properties of inscribed and circumscribed regular polygons; construction of regular polygons; perimeters and areas of regular polygons; circumference and area of the circle; methods of the determination of π ; problems. The subject of isoperimetrical polygons may be omitted.
GEOGRAPHY.	GEOGRAPHY.	THE GENERAL FACTS OF PHYSICAL AND POLITICAL GEOGRAPHY.
HISTORY OF UNITED STATES.	HISTORY OF UNITED STATES.	HISTORY OF THE UNITED STATES; HISTORY OF ENGLAND.
<p>The following suggestions are made for the guidance of those who are able to do more than master the requisites above stated:</p> <p>Although no requirements in Natural Science are specified, the study of Local Botany, Mineralogy, and Natural History is earnestly recommended, both because of the knowledge which may be acquired, and because of the habits of accurate observation of nature which may thus be formed in early youth.</p> <p>Students are advised to devote at least one year to the study of Latin before entering this department. It will greatly help their acquisition of Modern Languages, and will be useful in their study of science. Allen & Greenough's Grammar and Reader are especially commended as good manuals for this purpose.</p> <p>Proficiency in some one or more of the Modern Languages is also very desirable.</p>	<p>The following suggestions are made for the guidance of those who are able to do more than master the requisites above stated:</p> <p>Although no requirements in Natural Science are specified, the study of Local Botany, Mineralogy, and Natural History is earnestly recommended, both because of the knowledge which may be acquired, and because of the habits of accurate observation of nature which may thus be formed in early youth.</p> <p>Students are advised to devote at least one year to the study of Latin before entering this department. It will greatly help their acquisition of Modern Languages, and will be useful in their study of science. Allen & Greenough's Grammar and Reader are especially commended as good manuals for this purpose.</p> <p>Proficiency in some one or more of the Modern Languages is also very desirable.</p>	<p>Any two of the following subjects:</p> <p>(1) <i>Physics</i>. The elements of Physics (Avery's Natural Philosophy, Peck's Ganot's Introductory Course of Natural Philosophy, or an equivalent).</p> <p>(2) <i>Chemistry</i>. The elements of Chemistry (Eliot and Storer's Chemistry, Avery's Elementary Chemistry, or a thorough acquaintance with Mead's Chemical Primer). An examination on the more advanced chemistry will be offered to any who wish it. A successful completion of this examination will give the student admission to the chemical laboratory.</p> <p>Applicants who pass with honors in Chemistry will be put in an advanced division.</p> <p>(3) <i>Botany</i>. The elements of Botany. An accurate knowledge of Part I of Gray's How Plants Grow, together with an acquaintance with the more prominent native or cultivated plants, their structure and botanical affinities.</p> <p>(4) <i>Physiology</i>. The elements of Physiology (Hutchinson's, or an equivalent).</p> <p>(5) <i>Free-hand Drawing</i>. Line drawing from models, copying of patterns, etc. Particular attention is given to correctness of form and smoothness of outline. The endeavor will be to test the applicant in that free-hand use of the pencil which will be of most immediate value to him in pursuing the subject of mechanical drawing and mapping.</p> <p>(6) <i>Mineralogy</i>. The elements of Mineralogy. A good knowledge of the physical properties of minerals in general. Ability to determine by their physical properties alone twenty-five of the commonest minerals, and to give reasons for determination. First seventy-two pages of Nicol's Manual of Mineralogy, or first seventy-five pages of Dana's, third edition.</p> <p>(7) <i>Plane Trigonometry</i>. The development of the general formulæ of plane trigonometry, solution of plane triangles, and practice in the use of logarithmic tables. Four-place logarithmic tables are furnished for use in the examination.</p>

REQUIREMENTS FOR ADMISSION TO THE CLASSICAL COURSE.

1875.	1880.	1884.
ARITHMETIC. Higher Arithmetic in all its branches, including the extraction of square and cube roots, and the metric system of weights and measures.	ARITHMETIC. Higher Arithmetic in all its branches, including the extraction of square and cube roots, and the metric system of weights and measures.	ARITHMETIC. Prime and composite numbers; divisibility of numbers; factors, multiplication and division by factors; common divisors, multiples; fractions; decimals, including percentage, simple and compound interest, and discount; compound numbers and the metric system; involution, square root. The technical parts of Commercial Arithmetic—such as banking, profit and loss, commission, taxes, duties, stocks, insurance, exchange, average of payments—may be omitted.

REQUIREMENTS FOR ADMISSION TO THE CLASSICAL COURSE—Continued.

ALGEBRA. To Quadratics.	ALGEBRA. To Quadratics.	ALGEBRA. The definitions and explanations of the laws of signs in the four fundamental operations; theory of division of polynomials; factoring; highest common factor and lowest common multiple; fractions; simple and fractional equations; definition of the roots of an equation; simultaneous equations of the first degree; elimination by comparison, by substitution, and by addition or subtraction; inequalities; involution and evolution; fractional and negative exponents; radical expressions and surds; reduction and rationalization of surds.
GEOMETRY. Four Books.	GEOMETRY. Four Books.	GEOMETRY. Logical basis of geometry in its axioms and definitions; relations of angles and of triangles; equal figures; parallels and parallelograms; properties of polygons; properties of the circle; inscribed and circumscribed figures; areas of rectangles and of plane figures; ratio and proportion; linear proportion, and proportion of areas; similar figures.
GEOGRAPHY.	GEOGRAPHY.	GEOGRAPHY. The general facts of Physical and Political Geography; Ancient Geography.
HISTORY OF UNITED STATES.	HISTORY OF UNITED STATES; Greek and Roman History.	HISTORY OF UNITED STATES. Greek History to the death of Alexander; Roman History to the death of Commodus.
ENGLISH GRAMMAR.	ENGLISH GRAMMAR; Rhetoric.	ENGLISH. Candidates will be required to write a short composition, correct in spelling, punctuation, grammar, and division into paragraphs, upon a subject announced at the time of the examination. They will also be required to analyze sentences from the works used in preparation, and to pass an examination on Kellogg's Text-Book on Rhetoric as far as Lesson 72. For 1884 and 1885 the subjects will be taken from the following works: Tom Brown's School Days at Rugby; Irving's Sketch Book; Dickens' Christmas Stories; Scott's Lady of the Lake and Kenilworth; Shakespeare's Merchant of Venice and Julius Caesar.
LATIN. Cæsar; four books of the Gallic War.	LATIN. Cæsar; four books of the Gallic War.	LATIN. Cæsar; four books of the Gallic War, or two books of the Civil War.
Cicero; six orations.	Cicero; six orations.	Cicero; six orations.
Vergil, Eclogues, six books of the Æneid.	Vergil, Eclogues, Georgics, and six books of the Æneid.	Vergil; six books of the Æneid.
Latin Grammar, including Prosody.	Latin Grammar, including Prosody.	Questions on the subject-matter, on construction, on grammatical forms, and on Prosody, will form a part of the examination in Cæsar, Cicero, and Vergil.
	Jones' Latin Composition.	Translation into Latin of simple English sentences, suitable to those who have taken Jones' Latin Composition.
		Translation at sight of easy Latin Prose (with reasonable help in vocabulary and notes).
GREEK. Xenophon's Anabasis, three books. Homer's Iliad, two books (omitting catalogue of ships).	GREEK. Xenophon's Anabasis, four books. Homer's Iliad, two books (omitting catalogue of ships).	GREEK. Xenophon's Anabasis, four books, or the first 111 pages of Goodwin's Greek Reader. Homer's Iliad, two books (omitting catalogue of ships).
	Jones' Greek Composition.	Translation into Greek of simple sentences suited to the proficiency of those who have completed Jones' Greek Prose Composition.

REQUIREMENTS FOR ADMISSION TO THE CLASSICAL COURSE—Continued.

Greek Grammar, including Prosody.	Greek Grammar, including Prosody.	Questions on the subject-matter, on construction, on grammatical forms, and on Prosody, will form a part of the examinations in the Anabasis and Homer.
		Translation at sight of easy Greek Prose (with reasonable help in vocabulary and notes).

REQUIREMENTS FOR ADMISSION TO LITERARY COURSE.

1875.	1880.	1884.
<i>Requirements the same as for Colleges of Science.</i> Proficiency in some language besides English expected.	<i>Requirements the same as for Colleges of Science,</i> with the addition of Latin Grammar and Reader; Cæsar, four books; Greek and Roman History. Elementary acquaintance with some modern language recommended.	<i>Requirements the same as for Classical Course,</i> except that two Natural Sciences are substituted for Greek.

Age of Students Admitted.

The average age of students admitted to the Freshman Class in 1882 was 18 years 1 month; in 1883 it was 18 years 5.9 months; and in 1884 it was 18 years 6.5 months, showing that our requirements for admission continue to secure students of good maturity. A standard that secures students of this mature age is of course maintained at a sacrifice in the number of students; but it does not, I trust, admit of question that such a standard should be maintained, and that the lower grade of instruction, vastly important though it is, should be left to other schools.

Percentage of Students Conditioned.

In the following table will be found the number of students admitted from diploma schools—that is, schools whose graduates, upon the personal recommendation of the Principal, are admitted without examination—and of those that were examined, the percentage admitted without conditions, the percentage admitted with conditions, and the percentage rejected; also, the percentage conditioned in the several subjects of the admission examinations. In 1882, United States history and geography were counted as a single subject, as were also Cæsar, Latin at sight, and Latin composition. The blanks in the table indicate this fact with respect to these and the other subjects that were grouped and treated as single subjects.

It will be observed that the percentage of students admitted without conditions in 1884 was much smaller than ever before, and that the percentage rejected and also the percentage conditioned in the several subjects was much greater. This sudden and in many cases marked difference, is doubtless due to the fact that three important schools from which a large percentage of applicants have long been used to enter without conditions, have been accepted as diploma schools, and not to the fact that our examinations are so much more stringent than heretofore.

It is interesting and instructive to know that the most serious deficiencies occur in English. This, of course, shows that the singular neglect of English that has so long been a conspicuous fact in our

system of education, has not yet been remedied. Indeed, a different result could not so soon be expected. The work of changing, or rather revolutionizing the teaching of a subject, is not brought about in a day. Preparatory work in most of the subjects required for admission has been done in accordance with well defined and successful precedents. In English, however, the field is almost entirely new. Few, if any, of the teachers of to-day were taught as they are expected to teach. Indeed, the results now aimed at in the teaching of English were hardly thought of a few years ago. Teachers are, therefore, themselves learners. The hearty spirit of coöperation with which our attempt to assist in elevating the standard of English training has been met by the teachers of our State, deserves special mention. The result of this interest is highly promising.

Eng. 14 (b) -----	-----	-----	-----
Eng. 14 (a) -----	28.5	-----	-----
English History -----	22.8	29.5	61.4
Mineralogy -----	†	†	†
Free-hand Drawing --	50.	66.7	41.7
Physiology -----	21.4	17.5	9.7
Botany -----	11.	11.8	22.2
Chemistry -----	*	5.3	17.9
Physics -----	25.	10.	10.3
Roman History -----	-----	16.1	3.7
Grecian History -----	10.5	17.9	3.7
Greek Composition ---	-----	23.1	58.3
Homer -----	12.5	15.4	30.8
Greek at Sight -----	-----	7.7	28.6
Anabasis -----	6.2	7.7	30.7
Vergil -----	-----	17.9	20.
Cicero -----	13.1	8.9	17.4
Latin Composition ---	-----	44.6	45.8
Latin at Sight -----	-----	17.9	8.3
Caesar -----	13.1	7.1	25.9
Geography -----	-----	18.6	20.
U. S. History -----	12.3	20.6	14.
Geometry -----	28.7	34.	35.6
Algebra -----	20.5	26.	48.6
Arithmetic -----	20.5	15.	21.
English—I -----	12.3	34.3	46.9
Rejected -----	17.8	24.	40.
With Conditions -----	38.3	49.	45.
Without Conditions ---	43.9	27.	15.
From Diploma Schools	-----	-----	27.
1882 -----	-----	-----	-----
1883 -----	-----	-----	-----
1884 -----	-----	-----	-----

* No report.

† No applicants.

Counties Represented at the University.

Visits to different parts of the State have shown that the University is little known. The comparatively narrow limits from which students are drawn appear in the following table, containing the names of the counties represented for the present year, and for the two preceding years, together with the number from each. Of the fifty-two counties in the State, it will be seen that only thirty-five have sent us students, and that two counties invariably send more than twice as many as all the others combined. This showing is not only a sufficient warrant for whatever special effort may be necessary to make the privileges and opportunities of the University more widely known and appreciated, but almost in the nature of a demand for such effort.

COUNTIES.	1882-83.	1883-84.	1884-85.	COUNTIES.	1882-83.	1883-84.	1884-85.
Alameda -----	83	80	89	Sierra -----	-----	2	2
Butte -----	4	2	2	Solano -----	4	2	3
Contra Costa -----	3	5	2	Sonoma -----	2	1	5
El Dorado -----	1	1	1	Stanislaus -----	1	1	-----
Lake -----	-----	1	1	Sutter -----	-----	-----	1
Los Angeles -----	2	2	7	Trinity -----	1	-----	-----
Marin -----	-----	1	2	Tulare -----	1	1	-----
Mariposa -----	-----	1	-----	Tuolumne -----	3	2	1
Mendocino -----	-----	1	2	Ventura -----	1	-----	-----
Merced -----	2	1	-----	Yuba -----	3	1	3
Monterey -----	-----	-----	1	<i>Outside of the State.</i>			
Napa -----	-----	-----	2	Arizona -----	-----	1	2
Nevada -----	8	6	8	Central America -----	1	1	1
Placer -----	-----	-----	1	India -----	-----	-----	1
Plumas -----	-----	1	1	Japan -----	-----	-----	1
Sacramento -----	7	5	6	Nevada -----	1	3	2
Santa Barbara -----	6	9	7	Oregon -----	1	1	1
San Benito -----	1	1	2	Sandwich Islands -----	1	1	1
San Bernardino -----	1	2	3	South America -----	-----	3	3
Santa Clara -----	3	3	3	Residence unascertained -----	6	-----	-----
Santa Cruz -----	5	3	3	Totals -----	215	216	241
San Francisco -----	59	64	66				
San Joaquin -----	-----	3	1				
San Luis Obispo -----	-----	2	2				
San Mateo -----	4	2	2				

Want of Preparatory Schools.

The most serious drawback to the University is the want of suitable preparatory schools throughout the State, in fact, the entire absence of them in many portions of it, and to this cause may, doubtless, be attributed the slight representation of many counties in the University. The standard of admission to the University has, within a few years, advanced; while, under the discouragements of the new Constitution, the establishment of high schools has been retarded. It becomes, therefore, a very serious matter, pecuniarily, for parents in the country, or in our smaller towns, to send their children to a distant part of the State to have them prepared for the University, and afterward to continue them at the University for four years. And then, too, parents very rightly shrink from sending their children to school in our large cities, or near them, unattended, at an age when habits and character are most rapidly forming, and when they are most susceptible to unfavorable influences.

The reestablishment of high schools in all of our principal towns

would fill this gap between the grammar schools and the University, and supply to communities the necessary information regarding the more advanced education at the University, and stimulate the desire for taking it. It must always be difficult to bring a people to prize the higher education, if they are not accustomed to the encouragement and support of the intermediate.

I can think of no more lasting monument, and none more powerful in its influence for good, than the establishment of endowed schools of the type and rank of Exeter and Adams academies, in the East.

Diploma Schools.

An important step toward establishing closer relations between our higher grade public schools and the University, and a heartier coöperation between them, was taken last March by the Board of Regents, in adopting the following resolution:

Upon the request of the Principal of any public school in California whose course of study embraces in kind and extent the subjects required for admission to any college of the University, a committee of the Faculty will visit such school, and report upon the quality of instruction there given. If the report of such committee be favorable, a graduate of the school, upon the personal recommendation of the Principal, accompanied by his certificate that the graduate has satisfactorily completed the studies of the course preparatory to the college he wishes to enter, may, at the discretion of the Faculty, be admitted without examination.

It is well known that a similar regulation has long been in force in the University of Michigan, and that it has been attended with excellent results in identifying the interests of the secondary schools and the University. Indeed, the results proved so satisfactory to the University authorities, that private schools were later admitted to the same privileges as public schools; and now the privilege is extended to schools, both public and private, in other States.

There can be no doubt, I presume, that the excellence of the public school system in Michigan has been greatly promoted, if indeed, it is not greatly due, to this coöperation between the University and the secondary schools. The dependence of the University upon the secondary schools is, of course, absolute. Without them it can do nothing, and without their good will and coöperation it must fall far short of its full measure of usefulness. So, on the other hand, the University must always react upon the secondary schools, to their great benefit. Parents can have no warrant that the public school of the community in which they live offers as good educational opportunities as are offered in other communities, unless the scholarship in their school is measured by the same standard that is applied to other like schools throughout the commonwealth. It is quite true that the standard set by the requirements for admission to a college or University may not be in accord with what is felt to be the needs of an individual community, but it is, on the other hand, undoubtedly true that the requirements for admission to our best colleges and Universities are coming more and more to consist of such subjects, and only such, as should enter into the education of every member of a community—such subjects as will give to every pupil, whether he intends to enter the University or not, the best education that he could have up to that point. The result of giving to the University of Michigan the power to set the standard of education in the secondary schools throughout the State is, perhaps, the most evenly balanced system of public schools in the United States. A further result of this coördi-

nation in the school system is an active spirit of coöperation between the teachers in the secondary schools and those in the University. While the Faculty of the college indicates what, from the college standpoint, is desirable, the teacher, from the standpoint of the community, indicates what, in the temper of the community, and in the quality and capabilities of the teachers, is possible. The tendency of the University is constantly upward, and this upward tendency reacts powerfully upon the schools in the desire of the teachers to meet every new requirement made by the University; and this healthy stimulus is felt, not only by the teacher, but by the community. It becomes the ambition, not only of the teacher to see his school made a diploma school, but of the community as well. Indeed, I am told that the Principal of a high school in Michigan cannot feel at all secure in his position if he fails within a reasonable time to get his school on the list of diploma schools.

It was feared by some that the diploma system would have a tendency to lower the standard for admission; but the effect, has been on the contrary, to elevate it. It was believed by the several Faculties at Berkeley that the good results that appear to have followed the introduction of the system into the regulations of the University of Michigan would follow its introduction into our own University. Experience thus far seems to have justified this hope. Five schools applied for the privilege previous to last June, two of which were soon admitted. The course of study in one of the other three did not call for text-books that sufficiently covered the requirements for admission, and the Faculty therefore declined to receive the school. A very gratifying disposition to coöperate with the Faculty was shown by the Board of Education having control of the school in question, in the immediate authorization of the necessary text-books. The school was thereupon accepted.

Another of the three made application so late in the term that it was felt that there was not sufficient time left to make such an examination of the school as seemed necessary to warrant action. The work done in one department of the third school appeared deficient, and the school was not therefore admitted. Applications have thus far been received this term from three additional schools.

It has by some been felt that the requirements of the resolution of the Regents are unnecessarily strict, and too carefully observed by the Faculties. This feeling indicates that the purpose of the regulation was by some misunderstood. It is not intended that schools shall be admitted until they have in all fairness, and to the satisfaction of the Faculties, met the full requirements laid down in the regulation of the Board of Regents.

The effect of the regulation has thus far unquestionably been favorable to higher aims and higher scholarship in the preparatory schools, and it therefore promises to be highly beneficial to the University. It is my purpose, later, to institute a comparison of the records of students admitted on diploma and those who enter on examination.

Proportion of Students that Graduate.

The proportion of students that graduate, to the number that enter the University, is small, but whether smaller than is usual in institutions of like grade, I have not sufficient data to determine.

The following table shows the number of students that have entered the several Freshman classes of the University as regular students,

the number that graduated, the per cent that graduated, the per cent of the men entering who graduated, and the per cent of the women entering who graduated. Any number in the column headed "number entering," indicates the number of students that entered the class four years before the date at the left, the corresponding number in the column headed "number graduating" shows the number that graduated in that year. The other columns need no explanation.

CLASS OF—	Number Entering.	Number Graduating.	Per Cent Graduating.	Per Cent of Men.	Per Cent of Women.
1874 -----	32	23	71	-----	-----
1875 -----	65	25	38	-----	-----
1876 -----	64	30	46	50	27
1877 -----	52	27	51	52	50
1878 -----	82	26	31	31	37
1879 -----	155	56	36	33	72
1880 -----	97	41	42	41	46
1881 -----	99	22	22	20	40
1882 -----	101	37	36	34	71
1883 -----	67	32	47	41	81
1884 -----	61	20	32	24	87
1885 *-----	65	23	35	29	70

* For 1885, an estimate is made.

The reasons for the falling off, shown in the table, cannot be fully known. There are, however, sufficient data to account for a very considerable portion of it. Prominent among these reasons are limited means, ill health, and poor preparation. From August 13, 1883, to September 13, 1884, a period that includes the greater part of the absences that are likely to occur for the two years, thirty-eight petitions for leaves of absence were granted for terms varying from six months to an indefinite period. Of these, six proved to be for a short period only, fifteen gave lack of means as a reason, twelve ill health, two business propositions, one the wish to make special effort to bring up work in arrears; two gave no reasons.

During this same period sixty-four other students left college. Of these, seventeen are believed to have withdrawn to avoid being dropped into lower classes, or from the rolls of the University, seven withdrew on account of ill health, ten to go into business, seven failed to present themselves after enrollment, one removed from the State, six left upon the advice of the Faculties, and eleven for reasons not known. Of this total of one hundred and two students who withdrew, twenty-two have returned, or are likely to return, nineteen may return, and sixty-one are not likely to return. The sixty-one includes those who assigned no reason for leaving; those who went into business; those who withdrew to avoid being dropped; those who did not return after enrollment; those who left after four years without graduating; those who left by the advice of the Faculty; those who left for reasons not known to the Faculty; the student who removed from the State; and the one who returned to her class in an eastern college.

Scholarships.

The proportion of young men who have to leave the University because of limited means is large. There are others who manage to remain, but with resources entirely inadequate. Scholarships yield-

ing from one hundred to one hundred and fifty dollars a year each would enable many to remain who now have to leave, and many who remain under great difficulties to remain with comfort. When it is considered that an investment yielding from two to three thousand dollars a year would quite satisfactorily bridge over serious difficulties for fifteen or twenty deserving and promising students, it is reasonable to hope that such a fund may ultimately be accumulated for that purpose. In the light of these facts it can hardly be necessary to say how mistaken is the ill humored assertion sometimes made—that the University is an institution for the sons of the rich.

Health of Students.

The number of students who leave because of impaired health is noticeable in consideration of the fact that Berkeley is exceptionally healthful. It has sometimes been insisted that the work required overtaxes them. It is the purpose of the Faculty to give such an amount of work as will fairly occupy the time of the student of good average ability, who has had reasonably good preparation. It may be that one who acquires slowly, or who has had insufficient preparation, may find the work at times severe. But whatever difficulty there may be, is in a measure of the student's own choosing, for the conventional college course of four years is not an invariable requirement of the Faculty. The student who finds the prescribed work of any course too difficult for four years, has the liberty to lengthen the time to four and a half, or even to five years. And this plan has, in several cases, been very advantageously pursued. I wish that the idea might at once prevail that the time in which and the class with which an education is to be gained are matters of comparatively little moment.

A distinguished oculist of San Francisco has expressed it as his belief that much of the impaired eyesight of his patients is due to the injudicious use of their eyes on the cars and boats. I fear that some of the students have suffered from this cause.

Gymnasium.

The importance of combining systematic physical with systematic mental development, will hardly be questioned. But just how much the efficiency of the mind is impaired by the infirmities of the body can never be known, and it is difficult to convince any one that an unknown quantity is of prime importance. That physical education is of grave importance is becoming recognized by some of the best colleges in the country. Indeed, such satisfactory results have followed from systematic physical training, conducted upon scientific physiological principles, that the gymnasium is rapidly assuming an importance almost, if not quite, coordinate with many other branches of education. And by the systematic physical training that has been mentioned is not meant simple directions in athletics. It should be clearly borne in mind that it is not the purpose of a college gymnasium to make athletes, but to accompany the well balanced mental training of the college with an equally well balanced physical training. To that end it is fast coming to be recognized that the director of a gymnasium should be, indeed must be, a man who, after obtaining a thorough medical education, has made physical development a special study.

In some of the college gymnasiums of the country, each student, upon entering college, undergoes a careful physical examination, for the purpose of determining his physical inequalities. He then has assigned to him such special exercise in the gymnasium as will most rapidly and effectually remedy his weakness and restore a proper physical balance.

Similar examinations and assignments of work are continued at intervals throughout the entire college course, and it often happens that the student who enters in poor condition of bodily vigor, leaves with a fine physique. To direction in the gymnasium are added lectures on Physiology and Hygiene.

Through the liberality of Mr. A. K. P. Harmon, of Oakland, the University has a gymnasium building excelled by few college gymnasiums.

With slight additions every facility could be offered for that careful and systematic training, to which reference has been made, and anything less than which should not be thought of.

It certainly seems remarkable that our system of education should not somewhere include skilled direction regarding proper exercises and authoritative advice as to the conditions upon which a healthy and vigorous physical development is possible. I trust that means may be provided for such instruction and direction in this University.

Appropriations.

The committee appointed by the Board of Regents to inquire into the needs of the several departments of the University, at Berkeley, and recommend suitable appropriations, has done so. The report of that committee will be brought to your attention as a separate document. The recommendations contained in it deserve your earnest consideration, and will, I trust, receive your hearty support.

Affiliated Colleges.

The following reports upon the affiliated colleges have been condensed from reports made by Prof. John Norton Pomeroy, of the Hastings College of the Law; Prof. Robt. A. McLean, Dean of the Toland Medical College; Prof. S. W. Dennis, Dean of the Dental College; and Prof. W. M. Searby, Dean of the College of Pharmacy. In condensing I have adopted the original wording whenever consistent with the form of condensation that was made necessary by the limits set for this report. I have not, however, deemed it necessary to attempt by quotation marks to indicate the portions exactly quoted.

I take great pleasure in calling attention to the fact that the Faculties of these colleges are making an earnest attempt to advance the standard of scholarship in the professions which their colleges represent. However difficult it may be to appreciate the fact, it is still a fact that until within a few years there was absolutely no preliminary qualification worthy of mention required for admission to most of the Colleges of Law, Medicine, Dentistry, and Pharmacy in the United States. About fifteen years ago the number of students in one of the first medical colleges in the United States fell off one half in a single year, because of the establishment of admission examinations much less severe than those required for entrance to the undergraduate department of our own University; and yet to the graduates of this college were intrusted the issues of life and

death. Even at the present time there can hardly be said to be any serious requirement for admission to these professional colleges throughout the country. The importance, then, of any decisive step in this direction is great.

The question of establishing written examinations for admission to the law college of a character that will secure students with fuller preliminary mental training, is now under consideration. The further question of requiring applicants for all colleges alike to pass the examinations required for admission to some one of the undergraduate departments of the University, and of conducting these examinations simultaneously at Berkeley has been mooted. I need not say that such a step would mark an era in professional education, and the development of our University. I do not doubt that Colleges of Law and Medicine will ultimately require an education equivalent to that given in the usual college course as a requisite for admission.

Examinations have been established for admission to the Colleges of Medicine, Dentistry, and Pharmacy. The Faculties of these colleges are fully alive to the importance of the steps already taken, and stand ready for further steps whenever experience warrants such a course.

The College of Pharmacy has suffered in numbers by the enforcement of its requirements for admission, but it has gained in efficiency, and in the confidence of the public.

It is proper for me to say at this place that the affiliated colleges are conducted without expense to the State, and without sharing in the income of the general University Fund. There is probably not a professor or instructor in them who does not make serious personal and professional sacrifices to attend to the demands of his college. The returns that they receive from tuition fees are hardly worth mentioning. Their work is emphatically a work for the public good.

Law.

The Hastings College of the Law opened in 1878, but the three classes were not completed until 1881. The first graduating class, that of 1881, numbered forty-five members; the second, that of 1882, numbered forty-one members, one of whom was a woman; the third, that of 1883, numbered thirty-nine members, two of whom were women; and the fourth, that of 1884, numbered twenty-eight members. The number of students enrolled for the academic year, 1882-83, was one hundred and thirty-six. The number enrolled for 1883-84, was one hundred and thirty. The average age of the last graduating class was a little over twenty-five years. The average age of the body of students is about twenty-two years. By a regulation of the Board of Trustees, no person is allowed to enter the junior class until he has attained the age of eighteen years. About twenty-nine per cent of the students are college graduates. Under the liberality of the founder, instruction in the college is virtually free, the only charge being a fee of ten dollars each year for the purpose of defraying incidental expenses, such as lights, fuel, etc. Applicants for the junior class are examined as to their previous education, intellectual culture, and general knowledge. Applicants who do not have sufficient general knowledge and discipline to enable them to pursue the study of the law with profit to themselves, and with advantage to the State, are not admitted. In the Summer of 1881, out of about

seventy-five applicants, some twenty-five were rejected on these grounds. Since that year the number rejected has been much less, probably averaging not more than ten each year.

The number of students who enter and are enrolled during the junior year is always much larger than the number of those who go through the course and graduate. In the first class, which graduated forty-five members in 1881, there had been enrolled more than one hundred students. The second class, which graduated forty-one members in 1882, had numbered during its junior year about eighty.

The reason of this diminution is to be found in the peculiar character and position of this college. Being to all intents a free institution, naturally a large number of young men and women enter and commence the study of the law, who have, in reality, no special taste nor fitness for that study, and who have not the knowledge and mental training sufficient to enable them to pursue the study with ease. They are attracted to the study from a vague notion that the legal profession is an honorable one, while they have no real notion of what qualities and attainments are necessary for even a slight degree of success in the study. They soon find that the study of the law requires time, labor, application, diligence, knowledge, and some natural aptitude or talents. Of this class, a large number voluntarily drop out, cease the study, and quietly leave the college, and turn to other pursuits, before the junior year is ended. Of a Junior class which opens with seventy, perhaps twenty, on an average, will thus voluntarily withdraw from the class and from the college during the first year. Of those who do not thus voluntarily withdraw, but continue until the end of the year, another large portion are dropped out and leave the college at the examination for promotion. All who have been indolent and careless, and all who have no ability to comprehend the study and are thus unable to pass the examination, are not promoted into the middle year, and are dropped. The same process takes place in the middle year. The examination, at its close, generally drops out a few more, so that the Senior class is necessarily made up only of those students who have possessed knowledge, fitness, diligence, etc., sufficient to carry them through all these examinations.

The graduates are permitted, under the statute creating this college, and by the action of the Supreme Court, to be admitted to the bar without any further examination.

The course of instruction is certainly as comprehensive and as thorough as that of any other institution in the country. Extending through three years, there is full opportunity to apply in the third or senior year, in a practical manner, the principles and doctrines which are studied in the two preceding years. The methods of instruction, peculiar to this school, including the exercises in preparing pleadings and other papers, and the examination of cases in the form in which they arise in the lawyer's professional business, are intended to be at once practical and scientific—scientific in the presentation and study of principles and settled doctrines, and practical in familiarizing the student with the modes of applying these principles and doctrines to concrete facts.

It is sometimes rather foolishly objected to the Law School that it will increase the number of lawyers in the State. The foregoing facts show that this objection has no foundation in fact. The Law College will have a tendency to lessen the number of lawyers, because only those who are in reality fitted to be admitted to the bar can be gradu-

ated and admitted through its agency. It will necessarily raise the standard of legal education and attainment in this State, and tend to diminish the number by making a larger knowledge and more extensive acquirements essential for admission and success.

Medicine.

During the session of 1883, there were sixty-three matriculants. The Senior Class numbered thirteen; the Junior, twenty; and the Freshman, thirty. The following table contains information of interest regarding the classes graduating in 1883 and 1884:

	1883.	1884.
Number of applicants for the degree	19	13
Number of applicants rejected	4	2
Average age of applicants	25 years.	28 years.
Graduates of colleges	4	2
Number having degree of A.B.	3	2

The course of lectures and clinics during the session of 1883, consisted of a preliminary session, beginning February first, and ending April thirty-first, and a regular session, beginning June first, and ending October thirty-first. The year had been thus divided into two sessions in order to give students an opportunity to dissect and attend the clinics at the hospital to a greater extent than was possible during the regular session. Attendance upon the preliminary session, however, was not required; but it was found that a large proportion of the students availed themselves of the advantages of this extra course.

In the Catalogue of the Medical Department for 1883, it was announced that in 1884, and each year thereafter, the regular session would be lengthened to nine months, beginning February first, and ending October thirty-first. Accordingly, the present session began Monday, February fourth, with a class of forty-five matriculants. The Senior class numbers fourteen; the Junior, fifteen, and the Freshman, sixteen.

The course of instruction now covers a period of thirty-six weeks, exclusive of a vacation of two weeks in the middle of the term. Didactic lectures are delivered five days in each week, at the college building, and clinics are held every other day at the hospital. By this arrangement the number of lectures in each subject is increased by nearly one third; and as the total time of the course is materially lengthened, the student has more time to read and dissect than under the old arrangement.

The Didactic Chairs are: Theory and Practice of Medicine, Theory and Practice of Surgery, Obstetrics and Gynecology, Anatomy, Physiology and Microscopy, Therapeutics, Materia Medica and Medical Chemistry, Mental Diseases and Medical Jurisprudence, Diseases of Children, and Hygiene. The Clinical Chairs are: Clinical Medicine and Pathology, Clinical and Operative Surgery, Ophthalmology and Otology, and Clinical Obstetrics and Gynecology.

Theory and Practice of Medicine: Seventy-two lectures are now delivered in this subject, instead of sixty as heretofore. The course consists of a systematic history of disease and the means which experience has pointed out as curative.

Theory and Practice of Surgery: This branch also now embraces a course of seventy-two lectures, during which the student is taught the principles of surgical practice and drilled in the use of instruments and surgical dressings.

Obstetrics and Gynecology: This chair includes both a didactic and a clinical course, the former consisting of a series of one hundred and eight lectures at the college, and the latter of thirty-six clinical lessons at the City and County Hospital.

Physiology and Microscopy: Seventy-two lectures are delivered in this branch, and when necessary they are illustrated by vivisections and the practical use of the microscope.

Therapeutics: At the time of the last report this chair was vacant, but has since been filled, and the course now consists of seventy-two lectures, in which the various remedial measures for the cure of disease are fully described.

Materia Medica and Medical Chemistry: This course has been lengthened from forty to seventy-two lectures, and comprises the history, method of preparation, and the medicinal action of the different substances forming the *materia medica*. The combination of drugs is illustrated by pharmaceutical and chemical experiments.

Anatomy: Seventy-two lectures are devoted to this branch, and are illustrated by dissections of the cadaver, and by dry and wet preparations of the various regions of the body. The course includes a series of dissections by each student of the Junior and Freshman Classes.

Medical Jurisprudence and Mental Diseases: A course of thirty-six lectures upon this branch is given, in which the various phases of mental derangement, and the legal questions involved in this class of cases, are fully elucidated.

Hygiene: The course in this branch has been increased to thirty-six lectures also, and explains the principles of modern sanitary science, and the practical methods of reducing the evil effects of unsanitary conditions.

Clinical Medicine and Pathology: The practice of medicine is exhibited to the class by a series of one hundred and eight clinics, in which the students come directly in contact with the sick at the bedside, and examine and prescribe for them, under the observation of the Professor of Clinical Medicine.

Clinical and Operative Surgery: One hundred and eight clinics are held in the surgical wards of the City and County Hospital, in which all of the operations in surgery are shown to the students, and the various surgical dressings and appliances are demonstrated upon the patients.

Ophthalmology and Otology: Seventy-two clinics are held upon diseases of the eye and ear during the session. The system of instruction is the same as that pursued in the medical and surgical wards.

Clinical Obstetrics and Gynecology: This clinic is held thirty-six times during the term, and gives the senior students a practical familiarity with the management of labor cases. Each student has one or more cases, which he conducts throughout by himself. In the Gynecological clinic, the students witness the operations performed for the cure of surgical diseases in the female sexual organs.

Diseases of Children: This Chair has recently been added to the Medical Department, and the course consists of thirty-six lectures, in which the diseases peculiar to childhood are described.

Dentistry.

The number of students in attendance during the past three years, and the number who have graduated, are shown in the following table:

	1882.	1883.	1884.
Number of matriculates -----	36	33	25
Attended full course of lectures -----	21	23	-----
Average age of matriculates -----	27 $\frac{3}{4}$	24 $\frac{1}{2}$	23 $\frac{1}{2}$
Received degree of D.D.S. -----	8	7	-----
Rejected on examination for degree -----	1	3	-----

Of the matriculates in 1882 and 1883, one was a graduate of University College and one of the New Orleans High School. Of those who matriculated in 1884, one had graduated at the Spring Valley Grammar School, one at the Jennings' Seminary, one at the Boys' High School of San Francisco, one at the San José High School, and one at the University of the Pacific.

The entire graduating class of 1882 was composed of dentists, whose time of practice ranged between seven and twenty-four years, and who took advantage of the provision in our regulations which makes dentists of seven or more years practice, who pursue one full course of study in this college, eligible to the degree of D.D.S. Of the graduates of 1883, five completed the required two years course, while two, one of whom had been ten, the other seventeen years in practice, received their degrees on the completion of a one year course.

At the annual meeting of the Faculty, held December, 1882, upon the declination of Professor Dennis to serve as Dean for the ensuing year, Professor Goddard was elected. At the expiration of Professor Goddard's term of service, Professor Dennis was again elected Dean. The session of 1883 began with a preliminary term, extending from March first until April thirtieth. The regular term began June first and ended October thirty-first. With the session of 1884, the college discontinued the preliminary term, and began a regular term of nine months, lasting from February to November inclusive, with a preliminary examination upon the elementary principles of English composition, mathematics, and physics. These requirements place the standards of admission to the college equal to those of the best dental colleges of America and Europe.

The following is the time-schedule of instruction for the session of 1884:

<i>Monday.</i>		<i>Tuesday.</i>	
9-12	----- Practical operative dentistry	9-10	----- Lecture on operative dentistry
12- 3	----- Practical mechanical dentistry	10-12	----- Practical operative dentistry
3- 4	Lecture on pathology and therapeutics	12- 2	----- Practical mechanical dentistry
4- 5	----- Lecture on mechanical dentistry	2- 3	----- Lecture on chemistry
		3- 4	----- Lecture on physiology
		4- 5	----- Lecture on anatomy

<i>Wednesday.</i>		<i>Thursday.</i>	
9-11	Practical operative dentistry	9-10	Lecture on operative dentistry
11-12	Lecture on surgery	10-12	Practical operative dentistry
12- 2	Practical mechanical dentistry	12- 2	Practical mechanical dentistry
2- 5	Practical operative dentistry under clinical instruction; one afternoon each week	2- 3	Lecture on chemistry
		3- 4	Lecture on physiology
		4- 5	Lecture on anatomy
<i>Friday.</i>		<i>Saturday.</i>	
9-11	Practical operative dentistry	9-12	Medical and surgical clinic at hospitals
11-12	Lecture on surgery	2- 5	Work in chemical and histological laboratories
12- 3	Practical mechanical dentistry		
3- 4	Lecture on pathology and therapeutics		
4- 5	Lecture on mechanical dentistry		

FINANCIAL STATEMENT FOR 1882-3.

Cash received from donations	\$535 00
Cash received from students	3,725 00
Total	\$4,260 00
Expenses, 1882	4,154 25
Balance on hand at end of term	\$105 35
Cash on hand and received, 1883	\$3,213 65
Expenses, 1883	2,259 90
Balance on hand at end of the term	\$966 75

The expenses of conducting the department consist in furnishing material for carrying on the mechanical and operative departments. No salaries are paid to professors, and but \$200 a term for three of the demonstrators, who are obliged to spend three half days per week at the college during the entire term.

Pharmacy.

The number of students in attendance upon lectures and examinations during the past two years is shown in the following table. Of the Junior class, in 1884, one was a special student in chemistry:

NAME OF CLASS.	Attending Lectures.		Attending Examinations.			
			1883.		1884.	
	1883.	1884.	Successful.	Unsuccessful.	Successful.	Unsuccessful.
Seniors	21	29	13	2	13	6
Juniors	40	25	31	2	17	2
Students from the Medical College	6	1				

The degree of Graduate in Pharmacy has been conferred upon twenty-six candidates during the past two years.

The diminution in the number of students, during the present year, was entirely in the Junior class, and was due to two causes:

First, the rule requiring all who do not present certificates entitling them to enter one of the high schools of this State to undergo a preliminary examination was enforced, and excluded some who had not the necessary common school education; and, secondly, the Dean discouraged young men whose education was very deficient, or whose knowledge of the rudiments of pharmacy was limited, from entering the college before they had made up some of their deficiencies. It is believed that these persons will be greatly benefited by the postponement of their college studies, until they have more fully informed themselves in those branches which the college is not especially designed to teach, but which are necessary as preliminary to the lecture courses.

The course of instruction consists of lectures on Chemistry, Materia Medica, Pharmacy, and Botany. The instruction is designed to supplement the practical knowledge acquired in the daily handling of drugs, and compounding of medicines, which constitutes the occupation of the students. They are presumed to be familiar with most medicinal and commercial chemicals, and with ordinary pharmaceutical processes, before they enter the college, where they receive systematic instruction, which enables them to work more intelligently, and carries them forward to an acquaintance with the principles of chemical and pharmaceutical science.

The *Lectures on Chemistry* begin with elementary physics, showing the general properties of matter, the forces of light and heat, and the relations of these to chemical action. Then follows a concise course of elementary and inorganic chemistry, including the electro-chemical theory, equivalences of atoms and radicals, chemical notation and nomenclature, and the laws of chemical combination. Afterwards the students are instructed in the more advanced departments of chemical philosophy, concluding with organic chemistry, in which the hydro-carbons, and their most important derivatives, the alcohols, ethers, organic acids, glucosides, alkaloids, etc., are studied.

The *Lectures on Materia Medica* treat of drugs and medicinal substances derived from the vegetable and animal kingdoms. They are considered, not from the physician's but from the pharmacist's standpoint. Hence their origin, purity, and chemical composition occupy the principal place in this course. Those characters by which each drug can be accurately identified; those indications which point to inferiority or superiority in quality; the means of detecting adulterations, and whatever tends to give the pharmacist an intelligent idea of the nature of each article of the materia medica, find a place in these lectures. The medicinal uses and doses are also given, and the antidotes to such as are poisonous. These lectures are illustrated by plates, specimens, and experiments.

The lectures on the *Theory and Practice of Pharmacy* are essentially practical, and are accompanied by demonstrations in the various pharmaceutical operations, such as the sources and management of heat, its application to the processes of evaporation, simple, fractional, and destructive distillation, sublimation, calcination, etc., as also in the various means adopted for comminuting drugs, the processes of solution, clarification, crystallization, dialysis, etc. The preparations of the Pharmacopœia are all studied, and the principles involved in their manipulation explained. Urinalysis and the use of volumetric solutions in testing medicinal chemicals, conclude the course.

The chair of *Botany* is devoted to instruction in the Senior class

only (elementary botany being taught by the professor of *materia medica* as a part of the Junior course in that branch), and the course embraces the geography of plants, structural, functional, and systematic botany. The work is illustrated by dissections with microscopic demonstrations.

The college is making satisfactory progress from year to year. Having now a building of its own, its professors look forward to the time when they shall be able to give a laboratory course in pharmaceutical and analytical chemistry. There is a suitable laboratory room in the college building; professors stand ready to give the desired instruction, and many of the students are anxious to take such a course, and although only a few thousand dollars are necessary for apparatus and appliances, yet, even, that small sum is wanting.

In the accompanying appendix will be found a tabulated statement of the courses of study in the several colleges and courses at Berkeley, a condensed financial statement, and a condensed statement of the land agent. For detailed statements of receipts and expenditures, and of the transactions of the land department, you are referred to the Secretary's reports for 1883 and 1884.

Very respectfully submitted.

W. T. REID,
President.

REPORT OF PROFESSOR E. W. HILGARD.

President W. T. Reid:

DEAR SIR: I submit herewith a report upon the present condition of the department under my charge, in its several branches, and of its operations during the past two years.

INSTRUCTION.

As regards, first, instruction, I regret to say that the hopes I have entertained of a rapid increase of students in the College of Agriculture have not been realized. Since it has become apparent that the agricultural course has ceased to be a safe harbor for the indifferent student and an easy road to graduation, its numbers have perhaps even fallen off; but there has been a corresponding increase of earnestness among those who do attend, that will certainly serve the objects for which the college was established better than the easy-going system which, in times past, led to its being considered the "Botany Bay" of the University. As matters now stand, those who really desire to pursue agricultural studies can do so without difficulty, by coming into the classes of either partial or special students, if they do not desire to graduate. And if under this arrangement the college should not have a graduate more than once in two years, it would still be fulfilling its functions better than by graduating students who have no serious thought of study, or of pursuing agriculture as a profession.

One serious drawback to the *bona fide* instruction, not only in the agricultural course, but in the University at large, has been the absence of a permanent provision for instruction in botany. When, eight years ago, the subject was transferred to this department, it was with no thought that it could permanently remain under the personal charge of the Professor of Agriculture; yet it might have so continued but for the unexpected and somewhat overwhelming development taken by the experiment station work. In attempting to carry all that thus gradually fell to my share, my health gave way, and although now so far recovered as to be able to carry the work of instruction in agricultural chemistry, I am constrained to say that it is altogether improbable that I will soon be able to resume so large an amount of lecture work, even if the pressure of the experiment station work left a physical possibility of doing so. While, therefore, still formally in charge of the subject of botany, I must positively decline to be held responsible, personally, for actual instruction therein, except in so far as the same can be brought within the limits of the course of agricultural chemistry.

During the past two years instruction in botany has been given during three months of one term, by Mr. E. L. Greene, an eminent

botanist, and with excellent results. During the past session, the services of Mr. Greene not being obtainable, the second term's course (economic botany) has been given in a somewhat modified form by Mr. W. G. Klee, in addition to his duties as gardener in charge of the agricultural grounds, and without extra compensation. This course was quite satisfactory, and unless a permanent arrangement should be made for filling the chair of botany, I should recommend that the same course be given by Mr. Klee during the coming term of this session. But of course this could not be expected of him without some additional compensation, should he return to his former position after the close of his present engagement. I cannot, however, too strongly urge the need of a permanent arrangement for instruction in botany, a subject which not only is of great intrinsic interest and importance, but which is constantly sought for especially by those students looking toward the position of teachers in the public schools, or elsewhere. Classes of fifteen to thirty could be formed each session without difficulty, were the matter once more put into a definite and satisfactory shape. In its relations to the agricultural course, the subject of botany stands as the doorway through which a large number of students have been induced to pursue that course, either fully or partially; and to its omission I attribute in a great measure the failure to secure an increase of students during the past two years.

It might be thought that this important subject ought to take precedence of the experiment station work, if the latter interferes with its proper presentation in the course. To this view, however, I should interpose an emphatic demurrer. I am satisfied that at the present time, the experiment station work is the most, if not the only, effectual way open to us to fulfill the mission of the College of Agriculture to promote "the liberal and practical education of the agricultural class" in their life pursuit. It is abundantly obvious that in their present state of mind, farmers will only exceptionally send their sons to the College of Agriculture. It is, therefore, to the farmers, *directly*, that we must address our efforts, in order to show them by tangible examples, appealing to that most sensitive of organs, the "pocket nerve," that it is worth their while to send their sons where they can acquire, not only the absolute knowledge of the science and practice involved in agriculture, but also the ability to use their five senses and a trained head, not only in rendering agriculture more rational and thus in the end more profitable, but also in elevating it, as a life pursuit, both in their own estimation and in that of the people at large.

Heretofore the results of the experiment station work have only been given to the public in annual or biennial reports, through which they were circulated only to a limited extent, and remained unknown, and therefore unappreciated, by the majority of the agricultural population. In order, therefore, to render the work more generally known and useful, we have followed the lead of the New York State experiment station, in issuing at brief intervals—ranging from one to three weeks—short "bulletins" of completed work, which are mailed to the newspapers of the State for publication of the whole, or of such portions as may be of interest to their immediate region. As parts of the annual report required by the original Act of Congress, they are also mailed to all the Agricultural Colleges and experiment stations in the United States, and to some of the more prominent domestic and foreign agricultural periodicals. A small proportion only are sent to indi-

vidual addresses, although it would be very desirable to do so in many cases. But even as it is, the question of postage is quite serious, and although the expense of printing is reduced to that of press work and paper only, by arrangement with the *Rural Press*, and the folding and mailing has thus far been done by the hands of volunteers, yet the aggregate expense is not a small burden upon the appropriation. Since, however, the publication and circulation of these bulletins has proved of the most unquestionable value in increasing public interest and coöperation, I trust that the continuance of this policy will be rendered practicable by a special provision therefor, as recommended by the Regents' committee. Twenty-five bulletins have been issued up to this date, but before the end of the year the number will probably reach twenty-eight. The average expense of each issue has been from six to seven dollars, including postage.

Mr. Dwinelle has for the last two years added to his work as Lecturer on Practical Agriculture, the superintendence of the field culture experiments, and the correspondence relating to these and cognate subjects, an elementary course in entomology, clearly called for by the dangers that threaten several of our most important cultures from the increase of noxious insects. As this is no specialty of his, he earnestly desires to have the subject placed in charge of a competent specialist as soon as possible. This, of course, is dependent upon a proper endowment of a chair of entomology, or a State appropriation for the purpose, which would very pertinently include the appointment of the incumbent as State Entomologist, charged with the investigation of the kinds and habits of the several noxious and beneficial insects existing in, or coming into the State. Much interest has been manifested in this subject by several associations and public bodies in the State, and a subscription for the purpose of raising an endowment fund has been started, headed by Mr. Dwinelle himself, with a handsome sum, conditioned upon the raising of an adequate amount. It is to be hoped that this movement may be successful, for the subject of economic entomology is one of unusual interest in this State, exposed as it is on all sides to the importation of new pests from all quarters of the globe by the most direct routes. Mr. Dwinelle's report gives a fuller presentation of the subject, and I commend it to your earnest consideration.

Mr. E. J. Wickson has, during the present session, again delivered his highly acceptable course on Dairying. It is greatly to be regretted that this course is not as widely and numerously attended as is warranted by the importance of the subject and the excellence of its presentation.

EXPERIMENT STATION WORK.

I include under this now well understood designation that part of the work of my department intended to serve for the elucidation of questions relating to agriculture in its widest sense. It can hardly be necessary to repeat in the present report the general discussion of this subject already given in previous ones. The growing appreciation of such work by those practically interested in agriculture is abundantly attested by the establishment, within the last two years, of a number of State experiment stations, as well as by the proposition now before Congress (and indorsed by a resolution passed at the late session of our Legislature), to establish, on behalf of the United

States, such stations at each one of the agricultural colleges; while the latter themselves have, with few exceptions, now officially recognized the necessity of supplementing the educational work specially designed for the rising generation, by that which addresses itself directly to the farmers themselves; and which, by affording to them the aid of scientific investigations in determining the solution of practical questions and difficulties, tends to render the parents more appreciative of the advantages which a professional education may bestow upon their sons. This I believe to be a truer path toward the "liberal and practical education of the industrial classes in the several pursuits and professions of life," than that which leads to the filling of the college halls by lowering the standard of instruction to that of a mere school of handicraft. It is of the most especial and obvious importance in this State, where the rude culture of the grain grower, exhausting the soil without regard to the future, is fast being superseded by those cultures of which the successful exercise imperatively requires the possession and use of knowledge and judgment. As the progress of the fruit industries increases the area given to the orchard and vineyard, a corresponding increase of a certain degree of professional qualification therefor must needs take place. For in the case of fruits and vines, the proper selection from and treatment of the numerous varieties is the condition precedent of financial success, and skill determines the question of profit and loss to a degree unknown in general farming. In addition, the permanency and high value of investments of the former kind tends to a greater stability, both in the abodes and pursuits of the population; and the "turning out" of exhausted fields ceases to be a feature of the agricultural system whenever the land is occupied by trees and vines expected to endure from thirty to fifty years. The questions of manure supply, drainage, and many others usually relegated to the dim future of coming generations by the general farmer, now assume the guise of vital points to be immediately considered; and errors in the selection of soil and location, otherwise implying merely the partial failure of one or two field crops, are sedulously sought to be avoided because involving the loss of from five to ten years' time and of correspondingly heavy investments. The field cultures themselves involve a greater exercise of knowledge and judgment where irrigation forms a necessary part of the farmer's practice, continually calling into play the exercise of professional qualifications which the farmer must either himself possess or pay for.

In all these points of view, California stands preëminently in need of experiment station work of the broadest character, including, as it does in her case, the solution of problems never thus far approached under similar natural and social conditions. The irrigation question is here complicated by that of alkaline waters and soils, in a manner not heretofore dealt with by western civilization. The same question is now being grappled with by the British Government in some portions of India; but there the economic conditions are so widely different that what is feasible in one country may be utterly impracticable in the other. The problem must be worked out here independently, and that as quickly as possible, before costly mistakes are indefinitely multiplied. Again, the varied climatic conditions of this coast call for a diligent search, in similar climates elsewhere on the globe, for culture plants adapted to all these varied conditions.

All these points have been kept in view in the prosecution of the

experimental work; but the very multiplicity of the problems before us renders progress in each one necessarily slow when the means are so limited. Our policy has been to bestow most of the means at command in those directions where the need seemed greatest and most immediate, as manifested by the demand for information. For some years past the rise of the viticultural industry has been so rapid, and has engrossed so much of public attention, while offering so many undetermined questions of vital importance, that it has seemed proper to give it as large a share in our investigations as was compatible with the demand for other information.

THE WORK IN THE GENERAL LABORATORY

Has been diligently carried forward by Mr. F. W. Morse, who, however, has been repeatedly detailed to make field examinations relating to the phylloxera, and has also taken active part in the work in the viticultural laboratory whenever extra pressure rendered it needful.

As will be seen from the record of work given in Appendix No. 1, unusual attention has been given to the examination and sometimes elaborate analysis of waters, whether designed for irrigation or domestic use. The development of the "artesian belt" of Tulare and adjoining counties, and the extreme interest attaching to the availability of this important source of additional supply, has occasioned the transmission of numerous samples from that region for examination, and the publication of the results has been followed by similar applications from other parts of the State. While some portions of this work might more properly fall under the cognizance of the State Board of Health, its connection with the settlement of the State is so intimate that it seemed invidious to discriminate against such samples as were sent for examination as to their medicinal value, since such waters are a direct index of the probable character of the potable waters of the region concerned. The rule adopted has been that only such as were of obvious public interest should receive the benefit of a *quantitative* analysis, while others were only examined qualitatively to the extent of determining whether or not they would be likely to prove of importance from a sanitary point of view, when the farther investigation was left to be done at the expense of interested parties.

Concerning the artesian waters of the San Joaquin Valley, it is abundantly obvious that a fuller and more systematic determination of their character and distribution is urgently called for. It appears from the examinations already made that there are at least two water-bearing levels or regions, furnishing waters of entirely different properties: in some cases of excellent quality, in others dangerous to health as well as to lands upon which they may be used for irrigation, on account of the mineral salts present. The State Engineer's office has courteously furnished a list of bored wells now existing, the examination of whose waters would, in all probability, go far to solve the main question of distribution. It is intended, should time and means permit, to request the owners of these wells to furnish samples of the several waters for the purpose of analysis.

The examination and analysis of soils has again received considerable attention, in pursuance of the general plan, heretofore outlined, to collect as rapidly as may be the materials for a detailed soil map of the State. Requests for such examinations have of late become

so frequent as to seriously interfere with the systematic pursuit of the main object; yet naturally, as the knowledge of the several soil areas becomes more accurate, it is more frequently the case that definite information concerning the nature and adaptations of samples sent can be given by simple identification with others previously examined. Ultimately, of course, this will be the rule instead of the exception. In Appendix No. 1 will be found the results of the work on soils, including some which, on account of the immediate need of information, were made at private expense, the established rule being that samples sent are examined in their regular turn as received. Some of the soil analyses here given have also already been published and commented upon in the "Report on the Physical and Agricultural Features of California," which forms part of the Tenth Census Report on cotton production. As this report will be reprinted for general distribution through members of Congress, and has also been somewhat extensively distributed through the extra edition secured by the proprietors of the *Pacific Rural Press*, I omit from the present report a certain amount of matter relating to the soils of the State that should otherwise have found a place therein. It may, however, not be irrelevant to suggest that when in the course of a few years material additions shall have been made to our knowledge of the agricultural features of the State, a second and revised edition of this, or a similar work, to serve as a "handbook of the State," may be in order as an authentic source of information for both the present and the incoming population.

Apart from the main work on soils and waters, miscellaneous examinations of various materials of agricultural or commercial value have passed under our hands. Those relating to tanning materials are, perhaps, of the widest interest, as the question of an adequate supply of these is becoming more serious, in consequence of the rapid encroachments upon the forests of the native tanbark oak. Examination has shown that the bark of the black wattle, of Australia, as grown on the University grounds, is fully as rich in tannin as that imported from Australia; and as the tree is perfectly adapted to the coast climate, at least it should form a prominent ingredient of forest planting on the coast range. Similarly the European tanner's sumac, from which the Silician high priced article is derived, has been found to be as rich in tannin here as in its native country, and will, doubtless, occupy a place among our cultures. Hereafter both plants will be extensively tested by distribution of seed or plants from the University, as stated in detail in Appendix No. 3.

VITICULTURAL LABORATORY.

The almost total loss of the work of one vintage season (1882), in consequence of the exhaustion of the legislative appropriation, has been a serious drawback to the systematic progress of the comparative study of the grapes and wines of the State. Yet this loss is, in a measure, compensated by the conviction it forced upon the minds of viticulturists, that such investigations are necessary to the development of their industry; and by the greater and more directly helpful interest since taken in the work of the viticultural department. Last year eighteen wines were made, during the vintage season, from grapes partly contributed by persons desiring to have them tested, partly pur-

chased for experimental purposes. Besides, a considerable number of wines, ready made, were sent in for examination, considerably outrunning the working capacity of the laboratory. At the approach of the vintage season just passed a request was received from the Natoma Water and Mining Company, of Folsom, for the experimental treatment of the first crop of about forty varieties of grapes recently imported from Europe, and mostly fruited for the first time in this State; the results to be made public for the general benefit.

As our means were altogether inadequate for treating so many wines at once, the company offered to supply the needful caskage, while also defraying expenses of transportation. At the same time Mr. F. Pohndorff, the noted wine expert, offered his services, with those of his son, to carry out these tests, involving the all-important question of "the best grape varieties to plant," toward the solution of which this work would supply very essential data. Important contributions of grapes and wines were in the course of the vintage also received from sixteen other parties. The details of the work will be given in the "Viticultural Appendix" to the present report, to be issued later; but it should here be stated that even with the most effectual and valuable assistance thus rendered us, and with the assignment of the assistant in the General Agricultural Laboratory (Mr. Morse) to the viticultural work during the vintage, it has required the utmost exertions (including frequently work at night and on holidays) to carry through the amount of work involved. When, toward the end, it became apparent that without additional assistance the wine samples would not be in readiness for exhibition at the Viticultural Convention, held at San Francisco during the first week of December, I invoked the aid of the Viticultural Commission, which was responded to by the appointment of a special assistant (Mr. George E. Colby) for one month from December twelfth. We were thus enabled to submit to the Convention, as the outcome of the season's work, ninety-six samples of new wines, of which sixty-seven were made from single varieties, and nineteen were blends made by fermenting together the grape varieties concerned; the rest being wine blends made after fermentation. There was not time to analyze more than a small proportion of these wines before the meeting; and the full report of results cannot be given until February or March. The importance of even the partial results communicated was, however, fully appreciated by the Convention, as manifested in the resolutions passed by that body on the last day of its session, and a copy of which is herewith transmitted. The committee to whom the subject was referred fully recognized the inadequacy of the present arrangements for the requirements of the industry in the State, and upon its report the Convention recommends, as you will perceive, a very considerable enlargement of our facilities.

It is scarcely necessary to say that in order to enable us to continue the work on any similar scale during the coming two seasons, the amount of the appropriation for this purpose, as decided upon by the Regents' committee some time ago, should be materially increased. Not only must the cost of additional labor and assistance in the laboratory work be provided for, but also that of an addition to the viticultural laboratory building, for the purpose of storage. The work of the past season having already been seriously impeded by the want of adequate working room, it will be almost impracticable to carry on the next season's operations without removing elsewhere the large

additions made this season. The absolutely needful addition to the present building could be made for the sum of about \$1,000, while the necessary additions to appliances, caskage, and laborers' wages, would require, in addition to the sum of \$3,000 heretofore estimated, the additional sum of at least \$250 for each of the two years to be provided for. Altogether, therefore, including needful additions to apparatus and caskage, the appropriation for the viticultural work should not in any case be less than \$4,500 for the two coming years. It need hardly be said, however, that the accommodation afforded by the addition of a single room to the present establishment will, in the course of two years at farthest, also become inadequate; and as the present laboratory is also unsatisfactory, in that it affords room for only one worker where during the vintage season at least two must constantly be employed, and while as a matter of fact, two active workers would find abundant employment during the entire year: the question whether a wise economy would not suggest the erection of a suitable building, with room sufficient for the obviously imminent needs of this branch of the experiment station work, must be seriously considered. A building, such as could be erected and properly furnished with laboratory appliances at a cost of \$10,000, as suggested by the resolution of the Viticultural Convention, would provide for all that will be necessary for many years to come. Any less sum could be best utilized in additions to the present building, but should in any case include a material enlargement of laboratory facilities. It should also be kept in mind that with the progress of the work a demand for practical instruction in this speciality will doubtless arise, and that would call for all the room likely to be afforded by a building of a story and a half, covering the cellar space.

The increased facilities for work must, of course, be accompanied by a corresponding one of the working force, both permanent and occasional, if the increase of efficiency is to be realized. A principal and a sub-assistant would always find abundant work on their hands, and during the vintage season extra help would have to be called in, as was done during the season just past.

EXPERIMENTAL VINEYARD.

The experimental vineyard plot assigned to the University for experimental purposes by Mr. John T. Doyle, on his property on Cupertino Creek, and which was already planted with vines two years old, was last spring grafted over to forty varieties of grapes, a few of which actually came into bearing the present season. Authentic scions for the purpose were obtained from various parties in the State, partly by donation and partly by purchase; and among these are some new kinds only lately imported, and scarcely as yet fruited for practical trial in the State. During the coming season these grafted vines will already bear sufficiently for comparative experiments on the same scale as those made this year with grapes supplied by the Natoma company. But it already appears that the number of varieties should be materially increased in order to serve the purpose intended, and it may be best, with Mr. Doyle's consent, to regraft a portion of the plot to the new varieties now coming into prominence as the result of the season's work at the viticultural laboratory.

The vineyard near our propagating houses, which was found to be badly infested with the phylloxera when it came under my charge,

has continued to be devoted in the main to the study of the habits of this pest in this climate. Important observations on this subject have been made by Mr. Morse, as will be seen in the Viticultural Appendix to the present report. The native California vines, *Californicas*, planted in the very holes from which infested stocks had been taken up, have continued to flourish, although to some extent infested, and several of them have borne abundant fruit from the grafts made on them two years ago. We must therefore consider the resistance of this stock to the phylloxera as well established, and also that the fear prematurely expressed by some, viz., that the grafts on *Californicas* will not bear well, is entirely without foundation. It is possible to plant any vine on soil on which it will fail to produce, whether from being too poor or too rich; and the examples that have been quoted to support the adverse supposition are probably due to the last mentioned cause. It may not be irrelevant to state that I have acted upon my personal convictions in the matter by planting, in my own vineyard near Mission San José, chiefly the Californian wild stock, with a small proportion of eastern wild varieties, to be grafted upon.

Among the most pressing needs of this division of our work is, also, a material increase of the *library of works on viticultural subjects*, both for reference and study; and the formation of a *type collection of grape varieties*, for the identification of doubtful kinds. As regards the former point, it can scarcely be questioned that the viticultural library of the University ought, with a view to the commanding importance of the subject, to be measurably complete, both as to the literature of the past, and the current publications in the several grape-growing countries of the world, with which we are trying to compete. As yet our library lacks a large number of the most important standard works of reference, without which no thorough work can be done without frequent useless repetition of what has already been done elsewhere.

A standard collection of grape varieties should, if possible, be planted on the grounds of the University. But the fact that few varieties only can ripen their fruit in the climate of Berkeley, and the further disadvantage of the presence of the phylloxera among the vines now on our grounds, renders the propriety of incurring the required expenditure somewhat questionable until a location better adapted to the purpose can be secured by donation or otherwise. In the meantime a collection of dried specimens of the vine varieties, including leaves, shoots, and ripe wood, would be of essential service in the identification of doubtful kinds, so often called for. And such a collection could be made at a comparatively trifling expense, in the same manner as usual for other botanical collections. The chief expense involved would be the traveling expenses, and compensation of the collector, say one hundred and fifty dollars, all told.

GARDEN OF ECONOMIC PLANTS, ORCHARD, ETC.

Notes on the work in this department during the past two seasons are given in Appendix No. 3, which, however, falls seriously short of a proper showing, in consequence of the resignation of Mr. W. G. Klee, which was required by the Regents upon his acceptance of an appointment by the State Horticultural Society to go to the New Orleans International Exposition in charge of the exhibit of the

native and cultivated plants of California. The loss of Mr. Klee's services is greatly to be regretted, as it is extremely difficult to find persons properly qualified for a position requiring not merely the qualifications of a practical gardener, but also those of a botanist, and trained observer capable of observing correctly, and reporting in proper form and language, the results of experimental work. Since to these qualifications Mr. Klee adds that of the command of five languages, and of eight years' experience here on the spot, together with an extended knowledge of the various portions of the State, the void left by his resignation is a serious one, and, I trust, will be but temporary, since the labor thrown upon me by the necessity of training a new incumbent would form a most discouraging overburden, and is incompatible with the proper discharge of the numerous other duties already devolved upon me. During the present "slack season" in our work, Mr. Klee's ordinary duties have been divided out between the foreman, Mr. McLennan, Mr. Dwinelle, and myself.

The transcripts of the bulletins regarding the *distribution of seeds and plants*, given in Appendix No. 3, show the varieties that have been offered for distribution in either form. It should be stated, in addition, that, during the season 1883-84, about eight hundred and sixty invoices of seeds or plants were sent, about four hundred and fifty to different addresses within the State; including about twelve hundred plants of various kinds, seven hundred packages of seeds, and three hundred and fifty pounds of roots, chiefly of the so called "evergreen millet," or *Sorghum halepense*. Reports of results are now coming in, together with farther requests for seeds and plants, and it seems likely that the distribution of the present season will at least equal that of last. Among the more important kinds may be mentioned the European oak, of which last season three thousand acorns were sent out in lots of ten each; while during the present season about one thousand year-old seedlings of the same are offered. I am strongly impressed with the future importance of the European oak as a hard-wood timber tree for this State, especially its northern and middle portion, where its growth is nearly three times as rapid as that of any of the American oaks thus far tried here, while its wood is, throughout the Old World, the prominent one for the general uses of hard woods, including cask staves. For the latter purpose alone, its extensive planting should be carried forward as rapidly as possible.

It had been hoped that we would this season have a large supply of the seedlings of the European tanner's sumac for distribution; but from a large amount of seed imported from France only a few plants were obtained, and we are now propagating it as rapidly as possible from slips, in order to supply a few hundred plants for tests in various portions of the State. It may be thought that the gathering of the leaves of this valuable shrub could not be made commercially profitable with our high-priced labor. But this is one of the industries which, like silk culture, can be practiced on a small scale and yield a welcome collateral income to women and children not otherwise engaged, since the gathering can be done at several seasons during the long time of growth allowed by our mild climate. Similarly, the culture of the caper bush, which is a thorough success here at Berkeley, is one adapted to homes where numerous children render a little help from their hands a very desirable addition to family com-

forts. As our population increases, we must needs learn the value of the small industries for which the generous soil and climate of California affords such varied opportunities.

It seems very desirable that this branch of our work should be provided with more ample means for the introduction and propagation of useful plants from foreign countries. Up to this time most of our stock for this purpose has been obtained by exchange or by voluntary contributions.

I cannot omit to urge earnestly that provision be made for a new and more perfect heating apparatus for the propagating houses. The old one is so nearly worn out and so defective that during cold "spells" it is barely possible to prevent damage from frost in the warm houses, and our stock, embracing many valuable plants which it would be very difficult to replace, comes out of the winter in such a depressed condition that it requires many weeks to recuperate and serious losses occur every spring.

To the limited accommodation afforded by these houses, and their lowness, which compels us to dispose of our best plants just about the time when they have reached a respectable size and show what they are, I have repeatedly alluded in my reports, and can but reiterate what I have before said in regard to their inadequacy for our needs and purposes. At present they are sorely in need of new paint, but it seems hardly possible to afford this out of the funds available for the purpose.

The *orchard*, which passed under the jurisdiction of my department a few years ago, so badly pruned and so infested with insects that many trees ultimately succumbed in the process of regeneration, is now assuming, in some degree, the shape and usefulness originally intended. The trees are showing their natural form and are bearing fruit, which subserves the purpose of study and verification of varieties, and so far, as obtained in sufficient quantities, is either sold for the benefit of the department or sent to charitable institutions in the city and elsewhere. The persistent fight against the insect pests has now progressed so far that we can conscientiously offer to distribute scions to those desiring to test varieties not usually found in nurserymen's catalogues. Figures and descriptions of such varieties have appeared in a previous report and would be largely represented in the present one but for the absence of Mr. Klee. In one respect our orchard is now almost totally deficient, viz.: in cherries, of which a large variety was originally planted, but which died after some years in consequence of having reached an undrained surface of impervious subsoil. Until a drain of about a thousand feet in length is laid through this tract, it will be useless to plant anything permanently on it. Our soil is naturally so heavy that only underdraining can render it fit for the growth of cherries, or in fact, for anything else requiring a deep and loose soil.

There is another portion of our grounds, really the best soil of the field devoted to experimental field cultures, that stands in need of underdrainage as the first condition of its usefulness for any of our purposes. This piece will require a more extended system of drains, probably about twenty-five hundred to three thousand feet in all. A donation of one thousand feet of excellent drain tile was made toward this purpose by the firm of Gladding, McBean & Co., of San Francisco; but as yet we have not been able to incur the expense

of laying it down. This subject is more specially discussed in Mr. Dwinelle's report, which forms Appendix No. 2.

There is one branch of the work to which I have only casually alluded, and which yet consumes a considerable amount of time. This is the *correspondence* arising from letters of inquiry on a great variety of subjects relating to agriculture, which, as well as oral consultations, at certain seasons assumes such proportions as to be enough to occupy, alone, all the time not given to instruction. I find that, during twelve months ending October, 1884, three hundred and seventy letters have been written by myself personally in reply to inquiries or in reporting the results of examinations. Oftentimes such letters involve extensive research and discussion before an intelligent answer can be given; and when during the planting season they come at the rate of three or four a day, it becomes difficult to keep pace, unaided, with the demand for information. Letters relating to subjects falling within Mr. Dwinelle's special line of work, are ordinarily referred to him; and this, with the correspondence addressed to him directly, is no small tax upon his time also.

In conclusion, I respectfully suggest that it will become necessary to provide for more adequate compensation of the assistants in this work, if it is to continue to be efficiently prosecuted. The present salaries of \$900 per annum cannot long continue to form an inducement for young men, who by this very work become fitted for responsible and much better paid positions. As it has required years of training to fit them for their present positions, so it would again require years of unsatisfactory performance to train others. The laboratories and cellar can be made most useful adjuncts to the instruction of students, but upon condition that they are and remain occupied by competent chemists. At the same time, the work itself should not be hampered in its value and reliability by being handed over to new relays of novices every few years. The competent worker is worthy of corresponding compensation, and should have some prospect of promotion placed before him.

It is a grievous burden and drawback to success and utility when, every few years, a new, raw incumbent has to be trained in the performance of the varied work called for by the nature of the case; and the viticultural laboratory work, in particular, imitates so closely the large-scale practice that an assistant will, in a short time, be able to find profitable employment in the wineries now rapidly being established all over the State. While it might be very desirable to thus afford an opportunity for the scientific and practical training of experts, it should not go so far as to clog or prevent the attainment of the primary objects of an experiment station. If, as may be hoped, it becomes feasible to employ, permanently, two working assistants in the Viticultural Laboratory, the salary of at least one should be so gauged as to secure a reasonable permanency of one well trained man. The salary of the principal assistant should be from \$1,200 to \$1,500, according to ability; that of the sub-assistant, similarly, from \$900 to \$1,200. Without adequate remuneration we cannot expect such work as will form a safe basis for the heavy investments that will be largely directed by its results.

The same applies, of course, to the assistant or assistants in the general Agricultural Laboratory, who, in the course of time, become competent analytical chemists; and when called off to better paid positions are very difficult to replace, and not without a grievous loss of time, and of confidence in the work done by the department.

FINANCIAL NEEDS.

The following is a summary statement of the amount of appropriations which I think necessary for the prosecution of the work of this department.

A special committee of the Board of Regents reported early in this year the following sums as being requisite for the work of the department for the two ensuing years:

Department of Agriculture (lecturers, salaries, culture, experiments, labor, etc.)	---	\$15,000 00
Department of Viticulture	-----	3,000 00
Agricultural Laboratory	-----	1,800 00
For the purchase and distribution of plants and seed	-----	400 00
For the distribution of bulletins of the College of Agriculture	-----	300 00
Total	-----	\$20,500 00

Of these items, the second one especially would seem to require reconsideration in view of the heavy and growing demands made upon the viticultural laboratory, as stated above. The recommendation of the Viticultural Convention substitutes for the above item the following:

For building of new viticultural laboratory, and equipment of same	-----	\$10,000 00
For running expenses of same, at \$3,000 annually, for two years	-----	6,000 00
Total for viticultural work	-----	\$16,000 00

If in place of a new building sufficient for future requirements, additions to the present building be made, the following alternatives may be considered, viz.:

First—Addition of a single cellar compartment, with superstructure and equipments, caskage, and instruments. This would render possible the work of another vintage season, or possibly two, at an expenditure of about \$1,500.

Second—Doubling of the present cellar room and foundation, and erection of corresponding wooden superstructure of a story and a half. This would afford the necessary enlargement of the chemical laboratory, and storage room for perhaps six years to come. I estimate that this enlargement, with necessary additional equipments, could be carried out at an expense of about \$5,500.

There can be no doubt that the erection of a larger building for the permanent accommodation of a viticultural experiment station would be the most economical for the State; for it can hardly be questioned that a far greater need exists for such an institution here than in Europe, where, nevertheless, they are numerous. Successive additions will never make as useful a building, nor as cheap a one as can be constructed at once in accordance with a well digested plan.

Whichever alternative be adopted, the appropriation for current expenses, as above recommended (\$3,000 per annum for two years), should be maintained, in order that the needed additions to the laboratory and cellar facilities, and the services of an additional chemist (sub-assistant), as well as the necessary labor, may be secured.

Regarding the need of an increase of the compensation of the chemist employed in the general Agricultural Laboratory, I refer to the statements made on the previous page.

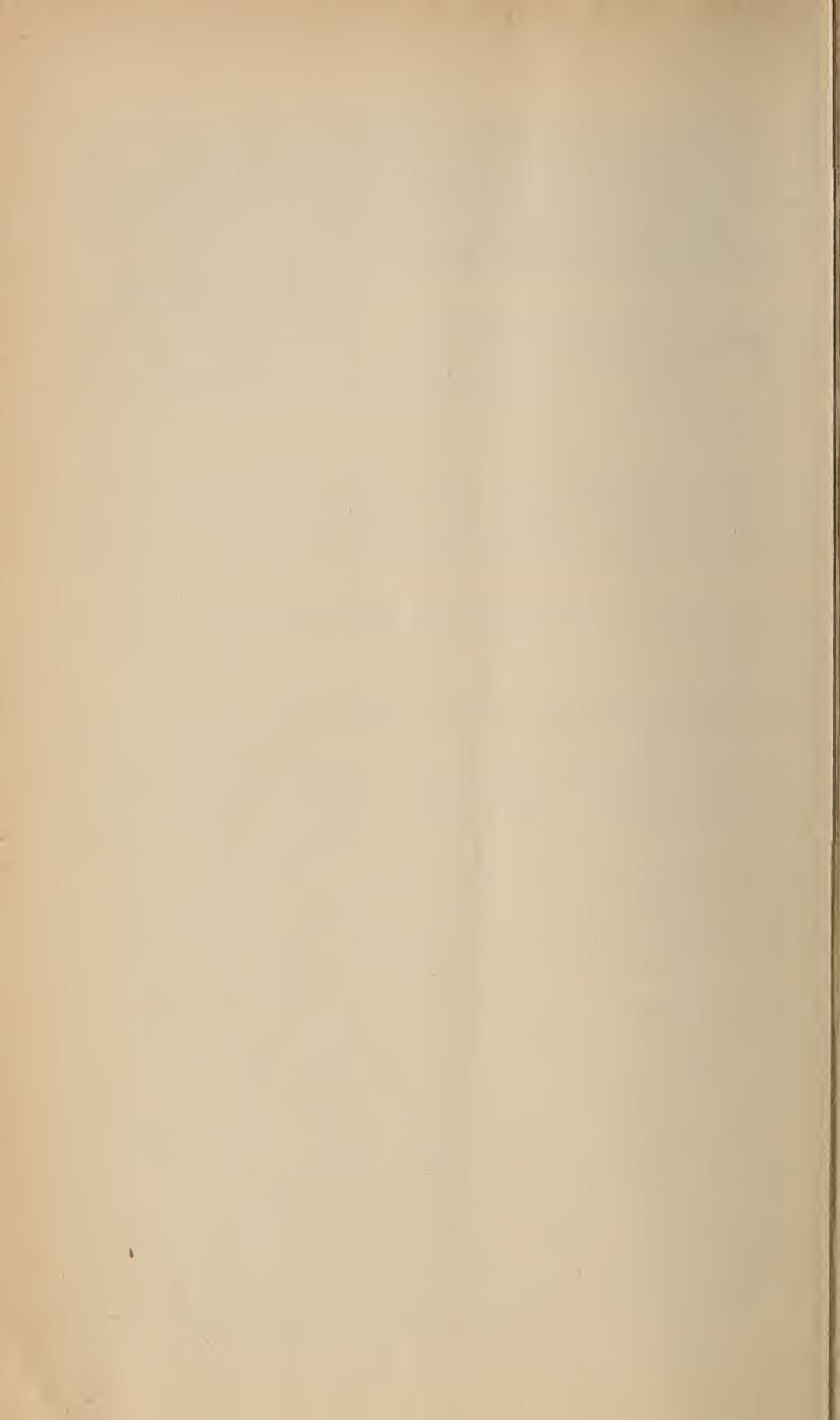
In reference to the last item given in the committee's estimate, viz.:

\$300 for distribution of bulletins, I state that unless the printing be done by the State Printing Office, involving much delay and trouble in the correction of the proof sheets, this item should be increased to \$500 for the two years; experience having shown that the increasing demand for these current publications more than doubles the expense incurred in the first issues.

All of which is respectfully submitted.

E. W. HILGARD,
Professor of Agriculture.

BERKELEY, December 10, 1884.



APPENDIX.

APPENDIX.

TABULATED VIEW OF THE UNDERGRADUATE COURSES OF INSTRUCTION.

	Classical Course	Literary Course	Course in Letters and Political Science	Course in Agriculture	Course in Mechanics	Course in Mining	Course in Engineering	Course in Chemistry
FRESHMAN YEAR, FIRST TERM.								
LATIN.—Livy	4	4	(4)	—	—	—	—	—
GREEK.—Homer, Herodotus, Thucydides	4	—	(4)	—	—	—	—	—
ENGLISH.—English prose style	4	4	(4)	4	4	4	4	4
Preparation of Summaries	—	—	—	1	1	1	1	1
Themes. Four	—	—	—	—	—	—	—	—
FRENCH.—Grammar and Translation	—	(4)	—	(4)	—	(4)	*(4)	—
GERMAN.—Grammar and Translation	—	(4)	(4)	(4)	4	*(4)	(4)	4
MATHEMATICS.—Geometry—Solid and Spherical, Algebra	—	—	—	6	6	6	6	6
Geometry—Solid and Spherical	4	4	4	—	—	—	—	—
HISTORY.—English, Seventeenth Century	—	—	4	—	—	—	—	—
FRESHMAN YEAR, SECOND TERM.								
LATIN.—Sallust, Horace	4	4	(4)	—	—	—	—	—
GREEK.—Thucydides, Xenophon, Demosthenes, Euripides	4	(4)	—	—	—	—	—	—
ENGLISH.—English prose style	4	4	(4)	4	4	4	4	4
Themes. Four	—	—	—	—	—	—	—	—
FRENCH.—Grammar and Translation	—	(4)	—	(4)	—	(4)	(4)	—
GERMAN.—Grammar and Translation	—	(4)	(4)	(4)	(4)	(4)	(4)	4
MATHEMATICS.—Trigonometry, Analytical Geometry	—	—	—	5	5	5	5	5
Algebra	4	4	4	—	—	—	—	—
CHEMISTRY.—Elementary Chemistry	—	—	—	4	4	4	4	4
HISTORY.—English, Eighteenth Century	—	—	4	—	—	—	—	—
SOPHOMORE YEAR, FIRST TERM.								
LATIN.—Terence, Plautus	3	3	(3)	—	—	—	—	—
GREEK.—Euripides, Plato	3	—	—	—	—	—	—	—
ENGLISH.—Old English: Grammar and Reading	3	3	(3)	—	—	—	—	(3)
Themes. Four	—	—	—	—	—	—	—	—
FRENCH.—Grammar and Translation	†(3)	(3)	—	(4)	—	(4)	(4)	—
GERMAN.—Grammar and Translation	†(3)	(3)	(4)	(4)	4	(4)	(4)	4
MATHEMATICS.—Differential Calculus	—	—	—	4	4	4	4	—
Trigonometry, Analytical Geometry	4	4	4	—	—	—	—	—
CHEMISTRY.—Inorganic Chemistry	—	—	—	2	2	2	2	2
HISTORY.—General European	†(4)	4	4	—	—	—	—	(4)
PHYSICS.—General Physics	—	—	—	4	3	3	3	4
BOTANY.—Structural and Physiological	—	—	—	3	—	—	—	3
Laboratory.								
CHEMISTRY.—Qualitative Analysis	—	—	—	9	8	8	8	9
Qualitative Blowpipe Analysis	—	—	—	—	4	4	4	4
MECHANICAL DRAWING.—Instrumental Drawing, Descriptive Geometry	—	—	—	3	3	3	3	(3)

* Students in the College of Engineering are recommended to elect French. Those in the College of Mining are recommended to elect German.

† Election must be made between French or German and Studies in History and Political Economy, and the course of study elected must be pursued for two years.

TABULATED VIEW OF THE UNDERGRADUATE COURSES OF INSTRUCTION—Continued.

	Classical Course	Literary Course	Course in Letters and Political Science	Course in Agriculture	Course in Mechanics	Course in Mining	Course in Engineering	Course in Chemistry
SOPHOMORE YEAR, SECOND TERM.								
LATIN.—Horace, Catullus, Tibullus, Propertius	3	3	(3)	—	—	—	—	—
GREEK.—Plato, Æschylus, Euripides	3	—	—	—	—	—	—	—
ENGLISH.—History of English Literature	3	3	(3)	—	—	—	—	(3)
Themes. Four	—	—	—	—	—	—	—	—
FRENCH.—Translation	(3)	(3)	—	4	—	(4)	(4)	—
GERMAN.—Translation	(3)	(3)	(4)	(4)	4	(4)	(4)	4
MATHEMATICS.—Integral Calculus	—	—	—	—	4	4	4	—
Elementary Calculus	(1)	(1)	(1)	(1)	—	—	—	(1)
CHEMISTRY.—Elementary Chemistry	(3)	3	*	—	—	—	—	—
Inorganic Chemistry	—	—	—	2	2	2	2	2
HISTORY.—General European	(4)	4	4	—	—	—	—	(4)
United States History	(4)	—	4	—	—	—	—	(4)
PHYSICS.—General Physics	—	—	—	4	3	3	3	4
BOTANY.—Systematic and Economic	—	—	—	2	—	—	—	(2)
Laboratory.								
CHEMISTRY.—Qualitative Analysis	—	—	—	9	12	12	12	12
BOTANY.—Determination of Plants	—	—	—	—	—	—	—	—
MECHANICAL DRAWING.—Instrumental Drawing, Descriptive Geometry	—	—	—	3	3	3	3	(3)
JUNIOR YEAR, FIRST TERM.								
LATIN.—Cicero, Quintilian, Juvenal	5	(5)	—	—	—	—	—	—
GREEK.—Sophocles, Plato	2	—	—	—	—	—	—	—
ENGLISH.—Shakespeare	(3)	(3)	(3)	—	‡3	—	‡3	(3)
Themes. Two	—	—	—	—	—	—	—	—
FRENCH.—De Staël, Molière	(3)	(3)	(3)	(2)	—	—	—	3
GERMAN.—Schiller, Ebers	(3)	(3)	(2)	(2)	2	—	—	—
MATHEMATICS.—Differential Calculus	(4)	(4)	—	—	—	—	—	(3)
AGRICULTURE.—Agricultural Chemistry	—	—	—	3	—	—	—	—
HISTORY.—General European	4	4	4	—	—	—	—	—
United States History	(4)	(4)	4	—	—	—	—	—
Roman Law; Jurisprudence	(4)	(4)	(4)	—	—	—	—	—
PHYSICS.—General Physics	4	4	4	—	—	—	—	—
ANALYTICAL MECHANICS	—	—	—	—	6	4	4	—
MECHANICAL DRAWING.—Graphostatics	—	—	—	—	2	—	—	—
CIVIL ENGINEERING.—Surveying	—	—	—	2	—	*(4)	4	(2)
ZOOLOGY.—Comparative Zoology	(2)	(2)	(2)	2	2	—	2	2
ENTOMOLOGY.—Elementary and Economic	—	—	—	1	—	—	—	—
BOTANY.—Structural and Physiological	(3)	(3)	—	—	—	—	—	—
MINERALOGY.—Crystallography, Terminology, and Descriptive	—	—	—	2	—	2	—	2
CHEMISTRY.—Chemical Philosophy	—	—	—	—	—	—	—	2
Laboratory.								
CHEMISTRY.—Qualitative Analysis	—	—	—	12	—	†(15)	—	15
MECHANICAL DRAWING.—Simple machine parts	—	—	—	—	6	6	6	—
Graphostatics	—	—	—	—	3	—	—	—
CIVIL ENGINEERING.—Field Practice	—	—	—	5	*(9)	—	9	(5)
JUNIOR YEAR, SECOND TERM.								
LATIN.—Cicero, Juvenal	(2)	(2)	—	—	—	—	—	—
GREEK.—Plato, Lysias	3	—	—	—	—	—	—	—
ENGLISH.—Middle English	(3)	(3)	(3)	—	—	—	—	(3)
Old English	—	—	—	—	3	—	3	—
Themes. Two	—	—	—	—	—	—	—	—

* The Chemistry of the Literary Course is required of those who did not pass the entrance examinations in Chemistry, but it may be taken at any time during the course.

‡ Required for degree of Mining Engineer.

TABULATED VIEW OF THE UNDERGRADUATE COURSES OF INSTRUCTION—Continued.

	Classical Course	Literary Course	Course in Letters and Political Science	Course in Agriculture	Course in Mechanics	Course in Mining	Course in Engineering	Course in Chemistry
FRENCH.—A. Dumas	(3)	(3)	(3)					3
GERMAN.—Schiller, Ebers	(3)	(3)	(2)		2			
MATHEMATICS.—Differential and Integral Calculus	†(4)	†(4)						(3)
AGRICULTURE.—Agricultural Chemistry				3				
HISTORY.—United States History								
POLITICAL ECONOMY.—General principles and laws	4	4	4	4				4
PHYSICS.—General Physics	(4)	(4)	(4)					
Physical Problems					3	3	3	
ZOOLOGY.—Comparative Zoology	(2)	(2)	(2)	2	2		2	2
ANALYTICAL MECHANICS					6	4	4	
MECHANICAL DRAWING.—Graphostatics					2			
CIVIL ENGINEERING.—Surveying							4	
MINERALOGY.—Descriptive Mineralogy				2		2		2
ENTOMOLOGY.—Economic Entomology				1				
<i>Laboratory.</i>								
CHEMISTRY.—Quantitative Analysis				12		†9 *6		15
MECHANICAL DRAWING.—Mapping					6	†(6)	6	
Mechanical Drawing					3		(6)	
Graphostatics						*9		
CIVIL ENGINEERING.—Field Practice							9	
<i>SENIOR YEAR, FIRST TERM.</i>								
LATIN.—Cicero, Horace	(2)	(2)						
Roman Literature	(2)	(2)						
GREEK.—Demosthenes, Aristophanes	(3)							
ENGLISH.—Chaucer	(3)	(3)	(3)					
Themes. Two for Cl., Lit., Let., and Pol.								
FRENCH.—Textes classiques	(2)	(2)	(2)					
GERMAN.—Schiller, Goethe	(2)	(2)	(2)					
PHILOLOGY.—Linguistics	(2)	(2)						
MATHEMATICS.—Any elective course offered	(3)	(3)						
CHEMISTRY.—Elementary Chemistry	(3)							
Inorganic Chemistry		(3)						
Organic Chemistry				2				2
HISTORY.—Comparative Constitutional	(4)	(4)	4					
POLITICAL ECONOMY.—History of principles and laws	(4)	(4)	4	4				(4)
PHILOSOPHY.—Courses not announced	(3)	(3)	(3)					
BOTANY.—Structural and Physiological	†(3)	†(3)						
ASTRONOMY.—Full course							3	
GEOLOGY.—Dynamical and Structural	(3)	(3)	(3)	3	3	3	3	3
PETROGRAPHY.—Methods, etc., (1), (2), (3), (4), and (5)								
AGRICULTURE.—Practical Agriculture and Horticulture				3				
MECHANICAL ENGINEERING.—Kinematics					2			
CIVIL ENGINEERING.—Strength of Materials					4		6	
MINING ENGINEERING.—Mining						2		
Metallurgy						3		(3)
AGRICULTURE.—Agricultural Chemistry								(3)
<i>Laboratory.</i>								
CHEMISTRY.—Quantitative Analysis				12				(18)
PHYSICS.—Advanced problems				3	6		6	3
MINERALOGY.—Det. of Minerals by physical prop.						2		4
MINING ENGINEERING.—Assaying						6		

* Required for degree of Mining Engineer.

† Required for degree of Metallurgical Engineer.

‡ To be taken with Sophomores.

TABULATED VIEW OF THE UNDERGRADUATE COURSES OF INSTRUCTION—Continued.

	Classical Course	Literary Course	Course in Letters and Political Science	Course in Agriculture	Course in Mechanics	Course in Mining	Course in Engineering	Course in Chemistry
MECHANICAL ENGINEERING.—Kinematics					3			
MECHANICAL DRAWING.—Construction					6	6	9	
SENIOR YEAR, SECOND TERM.								
LATIN.—Cicero, Vergil	(5)	(5)						
GREEK.—Aristophanes	(2)							
Greek Literature	(2)	(2)						
ENGLISH.—Advanced Old English	(3)	(3)	(3)					
Themes. Two for Cl., Lit., Let. and Pol. Sc.								
FRENCH.—Dumas	(2)	(2)	(2)					
GERMAN.—Schiller, Goethe	(2)	(2)	(2)					
PHILOLOGY.—Comparative Philology								
MATHEMATICS.—Any elective course offered	(3)	(3)						
CHEMISTRY.—Organic Chemistry				2				2
Physiological Chemistry				(3)				(3)
HISTORY.—Political Theories	(4)	(4)	4					
Interpretation of Constitution			(2)					
PHILOSOPHY.—Courses not announced								
BOTANY.—Systematic and Economic	(3)	(3)						
ASTRONOMY.—Full course							3	
Short course	(3)	(3)		(3)				(3)
GEOLOGY.—Historical Geology	(3)	(3)	(5)	3	3	3	3	3
PETROGRAPHY.—(5), (6), and (7)								(2)
AGRICULTURE.—Horticulture, etc.				3				
Agricultural Chemistry								(3)
MECHANICAL ENGINEERING.—Kinematics					2			
Hydraulics					4	4	4	
MINING ENGINEERING.—Mining						2		
Metallurgy						3		(3)
CIVIL ENGINEERING.—Engineering Structures							6	
<i>Laboratory.</i>								
CHEMISTRY.—Quantitative Analysis				12				18
MINERALOGY.—Det. of Minerals by phys. prop.						2		4
PHYSICS.—Advanced problems				3	3	(6)		3
MINING ENGINEERING.—Assaying						6		(6)
MECHANICAL ENGINEERING.—Kinematics					6			
Construction and Experimenting					6	(6)		
MECHANICAL DRAWING.—Construction					6	(6)	9	
<i>Optional Courses.</i>								
MATHEMATICS.—Modern Methods of Geometry								
Differential and Integral Calculus. Short course								
Exercises in the Calculus								
Fundamental Principles of the Calculus								
Elementary Course in Quarternions								
Analytical Geometry and Modern Algebra								
PHYSICS.—Special Physical Subjects								
PETROGRAPHY.—Microscopic, with laboratory practice								
ECONOMIC GEOLOGY								
CHEMISTRY.—Quantitative Blowpipe Analysis								
MECHANICAL ENGINEERING.—Thermodynamics								

FINANCIAL STATEMENTS.

STATEMENT OF CASH ASSETS AND LIABILITIES.

For the Fiscal Year ending June 30, 1883.

ASSETS.		
Cash balance with Treasurer, D. O. Mills, June 30, 1883	\$63,989 05	
<i>Cash Advances from General Fund.</i>		
Account of excess payments	13,767 08	
Account of Agricultural Department, awaiting receipts from State appropriation	1,222 13	
Account of Bacon Library and Art Building, awaiting receipts from State appropriation	455 89	
<i>Special Investment Fund.</i>		
Account of purchase of Merced County bonds, par value	\$20,000 00	
Account of premium at 18 per cent	3,600 00	
Account of purchase of Marin County bonds, par value	21,000 00	
Account of premium at 1.16, 1.54	3,392 34	
	\$47,992 34	
Less amount received from Controller, account of re-deemed San Luis Obispo bonds	8,000 00	
	39,992 34	
<i>Brayton Real Estate Fund.</i>		
Account of premium paid on \$7,000, Merced County bonds	945 00	
Account of Reese Library contingent fund	250 00	
<i>Cash Deposits.</i>		
With Security Savings Bank, account of excess payments	\$23,162 50	
With Security Savings Bank, account of Pioche donation	1,391 25	
	24,553 75	
With San Francisco Savings Union, account of Brayton Real Estate Fund	\$7,252 08	
With San Francisco Savings Union, account of United States Endowment Fund	5,247 92	
	12,500 00	
With Oakland Bank of Savings, account of excess payments	5,000 00	
With Union Savings Bank, Oakland, account of excess payments	\$6,000 00	
With Union Savings Bank, Oakland, account of Brayton Real Estate Fund	7,252 08	
With Union Savings Bank, Oakland, account of United States Endowment Fund	5,247 92	
	18,500 00	
Total cash assets		\$181,175 24

STATEMENT OF CASH ASSETS AND LIABILITIES—Continued.

LIABILITIES.		
Amount due United States of \$1 25 per acre on double minimum land -----	\$20,395 41	
Amount due Mechanical Department, balance of State appropriation -----	\$3,474 21	
Amount due Mining Department, balance of State appropriation -----	3,318 88	
	6,793 09	
Amount due Land Fund, grant of 15,000 acres awaiting investment -----	\$88,049 60	
Amount due Brayton Real Estate Fund, awaiting investment -----	2,840 07	
Amount due Seminary Land Fund, awaiting investment -----	505 99	
Amount due forfeited Seminary Land Fund, awaiting investment -----	2,480 00	
	93,875 66	
Amount due land administration, amounts withdrawn from savings banks for special investment in bonds -----	25,585 59	
Amount due D. O. Mills, endowment interest -----	7,513 35	
Amount due M. Reese Library Fund, interest -----	5,538 61	
Amount due Viticultural Fund -----	8 22	
Amount due Mineralogical Department -----	162 94	
Amount due State fees -----	10 00	
Amount due State Geological Survey -----	244 72	
Amount due F. L. A. Pioche donation -----	1,391 25	
Amount due unpaid bills -----	2,586 94	
Total cash liabilities -----		\$164,105 78
Excess of assets over liabilities -----		\$17,069 46

BALANCE

California, at Berkeley, California, June 30, 1883.

DEBIT.	DEBIT.	LEDGER ACCOUNTS.	CREDIT.	CREDIT.
Balances.	Face of Ledger.		Face of Ledger.	Balances.
-----	\$5,001,870 33	Amounts brought forward	\$3,499,447 84	-----
-----	56,417 20	Excess payments	76,812 61	\$20,395 41
-----	464 00	State fees	474 00	10 00
-----	-----	University Fund	290,281 00	290,281 00
-----	-----	State appropriation	287,535 39	287,535 39
-----	-----	State endowment, interest	459,886 36	459,886 36
-----	-----	Admission and tuition fees	2,170 00	2,170 00
-----	4,120 92	Rent from students' cottages	14,009 97	9,889 05
-----	4,173 13	State Geological Survey	4,417 85	244 72
-----	4,959 17	United States endowment, interest	147,154 29	142,195 12
-----	-----	Seminary Land Fund	505 99	505 99
-----	-----	Seminary Land Fund, interest	1,009 37	1,009 37
-----	-----	Forfeited seminary land, principal	2,480 00	2,480 00
-----	-----	Forfeited seminary land, interest	1,097 22	1,097 22
-----	-----	Forfeited seminary land fees	19 00	19 00
-----	-----	Audited demands on Controller	339,895 70	339,895 70
-----	-----	D. O. Mills' endowment	82,513 35	82,513 35
-----	-----	Agassiz Professorship of Oriental Languages	1,957 89	1,957 89
-----	1,260 50	Medal Fund (donation)	4,318 87	3,058 37
-----	728 88	Engineering Department Fund (donation)	750 30	21 42
\$18,675 56	75,835 46	San Francisco Savings Union	57,179 90	-----
26,790 15	40,128 09	Security Savings Bank	13,337 94	-----
-----	47,571 57	Land Agent of University	59,079 31	11,507 74
25,943 26	58,211 62	Union Savings Bank, Oakland	32,268 36	-----
-----	-----	M. Reese Library Fund	50,000 00	50,000 00
-----	-----	M. Reese Library Fund, interest	15,019 43	15,019 43
30,342 32	35,342 32	Seminary Land Fund, investment	5,000 00	-----
-----	889 42	Seminary Land Fund, interest	7,636 72	6,747 30
43,643 33	50,643 33	Brayton Real Estate Fund	7,000 00	-----
-----	1,565 72	Brayton Real Estate Fund, interest	11,705 17	10,139 45
5,353 00	6,748 15	Oakland Bank of Savings, Oakland	1,395 15	-----
-----	-----	H. D. Bacon donation	25,000 00	25,000 00
23,937 16	23,937 16	Land Administration Fund	-----	-----
-----	235 15	Land Administration Fund, interest	2,811 70	2,576 55
-----	4,745 00	Diverted Fund, interest	14,355 00	9,610 00
-----	1,108 75	F. L. A. Picche donation	2,511 59	14,028 84
61,729 77	61,729 77	Bacon Library and Art Gallery Building	-----	-----
39,992 34	47,992 34	Special Investment Fund	8,000 00	-----
-----	2,049 44	Special Investment Fund, interest	3,710 15	1,660 71
-----	-----	-----	-----	-----
-----	\$5,532,747 42	-----	\$5,532,747 42	-----

STATEMENT OF RECEIPTS AND DISBURSEMENTS FROM ENDOWMENTS, TRUST

<i>Receipts.</i>	
Land Fund, from sales of grant of 150,000 acres.....	\$66,553 22
Excess payments.....	3,999 13
Bills receivable, account of Land Fund.....	7,895 10
State fees, affixing State seal to patents.....	67 00
State appropriations:	
To Agricultural Department.....	\$4,934 94
To Bacon Library and Art Gallery building, furniture.....	2,933 16
To Mechanical and Mining Arts.....	5,739 00
	13,607 10
D. O. Mills endowment interest (on \$75,000).....	4,500 00
Michael Reese Library Fund interest (on \$50,000).....	3,000 00
Donation of Class of 1883 to Library.....	101 00
Special Investment Fund, redeemed bonds.....	8,000 00
Seminary Land Investment Fund, redeemed bonds.....	5,000 00
Brayton Real Estate Fund, redeemed bonds.....	7,000 00
Total.....	\$119,722 55

FUNDS, AND STATE APPROPRIATIONS FOR FISCAL YEAR ENDING JUNE 30, 1883.

<i>Disbursements.</i>	
Special Investment Fund:	
Purchase of Marin County bonds, par value	\$21,000 00
Bacon Library and Art Gallery building, furniture	1,633 39
Excess payments	8,238 71
State fees, paid Secretary of State for affixing State seal to patents	64 00
Mechanical and Mining Departments	9,135 17
M. Reese Library Fund Interest, purchase of books	3,235 11
Agricultural Department	5,203 68
Viticultural Fund	346 13
Mineralogical Department	21 80
State Geological Survey, insurance on material in New York City	95 61
Security Savings Bank, deposit of balance of Pioche Fund	1,391 25
Seminary Land Investment Fund:	
Purchase of Marin County bonds, par value	\$8,000 00
Purchase of Merced County bonds, par value	5,000 00
	13,000 00
Brayton Real Estate Fund:	
Purchase of Merced County bonds, par value	7,000 00
Union Savings Bank, deposit	2,406 87
San Francisco Savings Union, deposit	13,000 00
Total	\$85,771 72

STATEMENT OF RECEIPTS AND DISBURSEMENTS FROM INCOME AVAILABLE FOR

Receipts.	
Interest from Brayton property mortgage notes.....	\$3,178 30
Interest from Brayton Real Estate Fund, investment in bonds.....	2,773 65
Interest from balance of unpaid principal, due agricultural grant.....	13,698 51
Interest from United States Endowment, investment in bonds.....	19,396 84
Interest from Seminary Land Investment Fund, investment in bonds.....	1,199 27
Interest from State Endowment Fund, from sales of tide lands.....	50,040 00
Interest from diverted funds.....	4,785 00
Interest from Land Administration Fund, investment in bonds.....	1,178 50
Interest from Special Investment Fund.....	3,710 15
Land fees, for issuance of approvals, certificates of purchase, and patents.....	1,347 00
Mining Department, from students for chemicals.....	297 00
Cottage rents.....	1,367 00
Chemical laboratory, from students for chemicals and apparatus.....	940 00
College celebration, for diplomas.....	347 50
University Site Improvements, for rent of land.....	\$60 00
University Site Improvements, for sales of hay, etc.....	55 00
University Water Company, for sale of old pipe to Berkeley Water Company....	115 00
Physical laboratory, from students for chemicals.....	380 00
Admission and tuition fees.....	92 00
Land Administration, fees received by Land Agent for attendance at Court....	75 00
	4 00
Total cash receipts from income.....	\$104,924 72

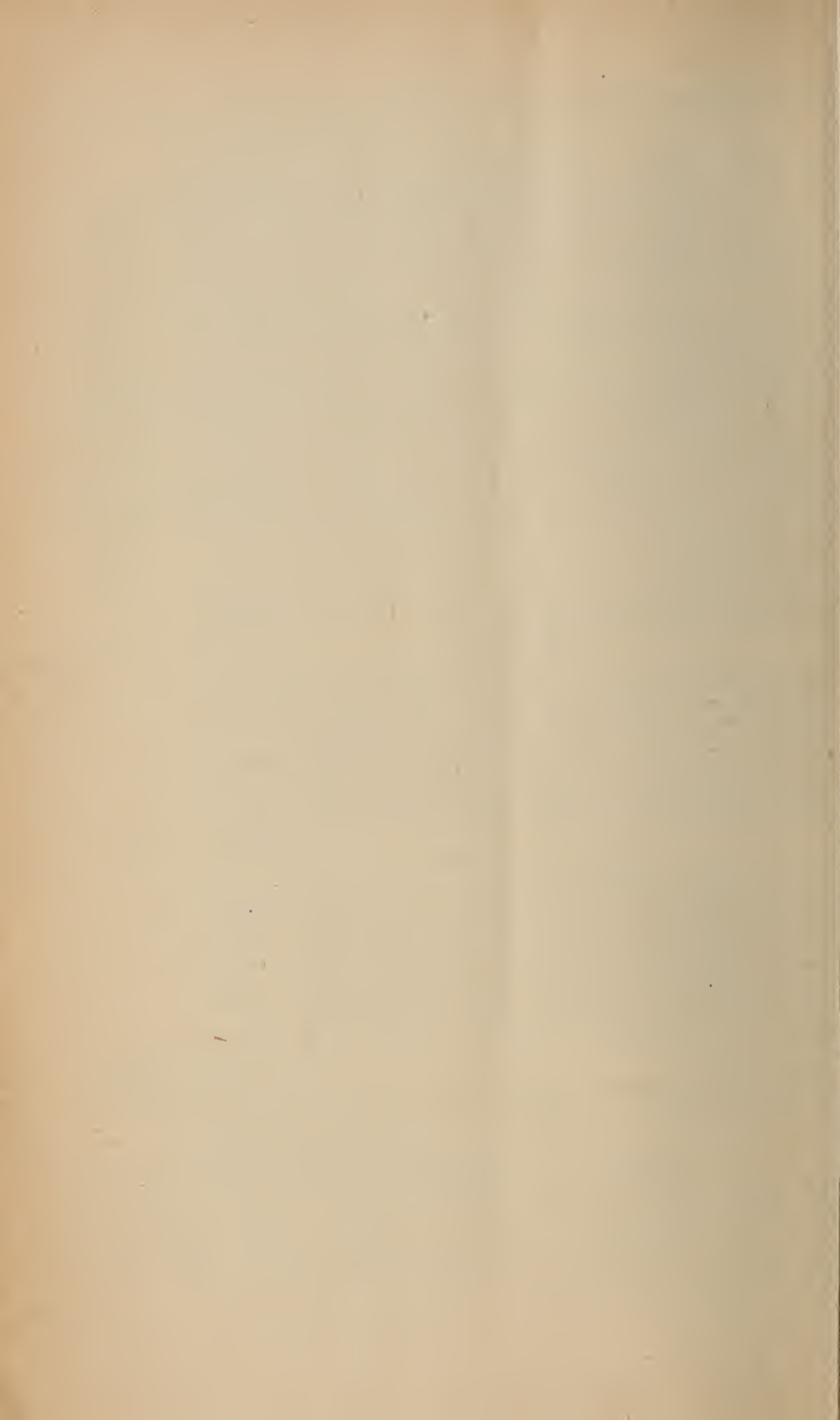
Recapitulation of Statements.

Cash receipts from endowment, trust funds, etc.	\$119,722 55	
Cash receipts from income available for current expenses	104,924 72	
Cash balance with Treasurer, D. O. Mills, June 30, 1882	26,423 68	\$251,070 95
Cash disbursements account of endowments, trust funds, etc.	\$85,771 72	
Cash disbursements account of current expenses, etc.	101,310 18	
Cash balance with Treasurer, D. O. Mills, June 30, 1883	63,989 05	\$251,070 95

THE PAYMENT OF CURRENT EXPENSES FOR FISCAL YEAR ENDING JUNE 30, 1883.

Disbursements.

Salaries—Educational	\$65,064 96	
Salaries—Attorneys, Secretaries, Land Agents, and janitors.....	13,210 00	
		\$78,274 96
Equipment and repairs		688 78
Fuel		786 10
Advertising and printing.....		206 10
Telegraphing and expressing		253 36
Stationery		94 34
Postage		246 80
Rent of San Francisco offices.....		450 00
University printing office, material		2 00
Land administration		674 71
Incidental expenses.....		1,424 00
University site improvements		2,817 41
University Water Company		326 79
Physical laboratory.....		248 02
Insurance		2,087 27
College celebrations		70 00
Official and lecturing expenses		349 68
Museum		359 85
Chemical laboratory.....		1,380 23
Library		225 60
Military department.....		51 00
Students' cottages		86 10
Interest and discount		28 44
Forfeited Public Building Land Fund.....	\$320 00	
Forfeited Public Building Land Fund—Interest.....	37 33	
		357 33
<i>Bond Premiums.</i>		
Account of United States Endowment, Marin County bonds, par value, \$8,000.....	\$1,292 32	
Account of Special Endowment Fund, Marin County bonds, par value, \$21,000.....	3,392 34	
Account of Seminary Land Investment Fund, Marin County bonds, par value, \$8,000.....	1,292 32	
Account of Seminary Land Investment Fund, Merced County bonds, par value, \$5,000.....	900 00	
Account of Brayton Real Estate Fund, Merced County bonds, par value, \$7,000.....	1,260 00	
		8,136 98
<i>Accrued Interest on Bonds.</i>		
Account of Special Investment Fund, interest on Marin County bonds, par value, \$21,000.....	\$455 00	
Account of Seminary Land Investment Fund, interest on Marin County bonds, par value, \$8,000.....	168 00	
Account of Seminary Land Investment Fund, interest on Merced County bonds, par value, \$5,000.....	372 22	
Account of United States Endowment Fund, interest on Marin County bonds, par value, \$8,000.....	168 00	
Account of Brayton Real Estate Fund, interest on Merced County bonds, par value, \$7,000.....	521 11	
		1,684 33
Total cash disbursements from income.....		\$101,310 18



FINANCIAL STATEMENTS.

STATEMENT OF CASH ASSETS AND LIABILITIES

For the Fiscal Year ending June 30, 1884.

ASSETS.		
Cash balance with Treasurer Jas. C. Flood, June 30, 1884-----		\$52,740 10
<i>Cash advances from General Fund.</i>		
For account of excess payments-----	\$16,542 16	
For account of Viticultural Department awaiting receipts from State appropriation-----	81 88	
For account of Agricultural Laboratory awaiting receipts from State appropriation-----	75 00	
For account of Library Building, furniture, awaiting receipts from State appropriation-----	242 27	
		16,941 31
Special Investment Fund, Merced County Bonds, par value-----		20,000 00
Reese Library Contingent Fund-----		250 00
<i>Cash Deposits with Savings Banks.</i>		
Security Savings Bank of San Francisco, account of excess payments-----	\$23,162 50	
Security Savings Bank of San Francisco, account of Pioche Donation-----	1,391 25	
Security Savings Bank of San Francisco, account of Brayton Fund-----	8,956 50	
		33,510 25
San Francisco Savings Union, San Francisco, account of Brayton Fund-----	\$18,459 67	
San Francisco Savings Union, San Francisco, account of Land Fund-----	2,995 83	
		21,455 50
Oakland Bank of Savings, Oakland, account of excess payments-----		5,000 00
Union Savings Bank of Oakland, account of excess payments-----	\$6,000 00	
Union Savings Bank of Oakland, account of Brayton Fund-----	13,955 50	
Union Savings Bank of Oakland, account of Land Fund-----	7,500 00	
		27,455 50
Total cash assets-----		\$177,352 66
LIABILITIES.		
Amount due United States of \$1 25 per acre on D. M. land-----		\$17,620 33
Amount due Mechanical Department, account of State appropriations-----	\$3,749 21	
Amount due Mining Department, account of State appropriations-----	3,137 73	
Amount due Agricultural Department, account of State appropriations-----	882 67	
Amount due Mineralogical Department, account of State appropriations-----	98 44	
		7,865 05
Amount due Land Fund, awaiting investment-----	\$35,231 32	
Amount due Seminary Land Fund, awaiting investment-----	505 90	
Amount due Forfeited Seminary Land Fund, awaiting investment-----	2,480 00	
Amount due Brayton Real Estate Fund, awaiting investment-----	34,667 50	
Amount due D. O. Mills Endowment, interest awaiting investment-----	12,013 35	
		84,898 16
Amount due M. Reese Library Fund, interest-----		1,982 71
Amount due State fees-----		69 00
Amount due State Geological Survey-----		253 22
Amount due F. L. A. Pioche Donation-----		1,391 25
Amount due Special Investment Fund, purchase of bonds-----		20,000 00
Amount withdrawn from savings banks for temporary investment in bonds-----		25,194 44
Amount due unpaid bills-----		1,608 50
Total cash liabilities-----		\$160,885 66
Excess of assets over liabilities-----	\$16,467 00	

From the Books of the Regents of the University of

DEBIT.	DEBIT.	LEDGER ACCOUNTS.	CREDIT.	CREDIT.
Balances.	Face of Ledger.		Face of Ledger.	Balances.
\$52,740 10	\$192,959 36	Cash deposits with Treasurer---	\$140,219 26	-----
953,731 55	1,055,606 74	Salaries-----	101,875 19	-----
41,637 72	43,695 87	Equipment and repairs-----	2,058 15	-----
11,737 08	12,039 93	Fuel, lights, and water-----	302 85	-----
10,593 14	10,815 79	Advertising and printing-----	222 65	-----
3,349 73	3,432 81	Telegraphing and expressing---	83 08	-----
2,610 84	2,670 84	Stationery-----	60 00	-----
2,584 11	2,698 61	Postage and revenue stamps---	114 50	-----
8,192 00	11,957 00	Rent-----	3,765 00	-----
1,961 34	2,101 62	Office expense-----	140 28	-----
3,017 08	3,017 08	University printing office---	-----	-----
-----	186,573 97	Land administration-----	226,067 13	\$39,493 16
9,609 85	10,315 60	Incidental expenses-----	705 75	-----
138,337 50	323,052 70	Bills receivable-----	184,715 20	-----
62,590 03	64,773 79	University site improvement---	2,183 76	-----
65,926 66	66,882 15	Agricultural department-----	955 49	-----
3,856 16	7,936 01	University Water Company---	4,079 85	-----
27,226 06	27,226 06	Students' cottages-----	-----	-----
1,592 88	176,590 01	Brayton property-----	174,997 13	-----
-----	80,882 54	College of California-----	83,435 00	2,552 46
405,710 57	405,710 57	Building Fund-----	-----	-----
148 60	148 60	Tompkins endowment-----	-----	-----
490 83	490 83	Toland Medical College-----	-----	-----
2,045 39	2,545 39	Preparatory department-----	500 00	-----
5,499 99	5,499 99	Free scholarship-----	-----	-----
21,545 28	21,784 53	Insurance-----	239 25	-----
5,494 01	7,013 26	College celebrations-----	1,519 25	-----
6,941 71	11,214 21	Official and lecturing expenses---	4,272 50	-----
22,450 43	22,671 56	Apparatus-----	221 13	-----
5,440 04	5,440 04	Museum-----	-----	-----
9,798 69	19,948 01	Laboratory-----	10,149 32	-----
38,551 46	39,234 69	Library-----	683 23	-----
2,247 74	3,861 37	Contingent Fund-----	1,613 63	-----
4,706 47	4,706 67	Military department-----	20	-----
72,573 48	73,705 07	Mechanical department-----	1,131 59	-----
518,000 00	587,993 80	United States endowment (in-	-----	-----
-----	60,611 35	vestment Land Fund)-----	69,993 80	-----
-----	35,859 97	Interest and discount-----	123,945 12	63,333 71
-----	2,818 15	Land Fund-----	589,091 29	553,231 31
-----	22 00	Land interest-----	271,273 48	268,455 31
3,857 93	4,069 18	Fee Fund-----	13,203 00	13,181 00
3,239 20	3,480 10	Viticultural Fund-----	211 25	-----
4,901 56	4,901 56	Physical Laboratory-----	240 90	-----
-----	60,214 06	Mineralogical department---	-----	-----
-----	519 00	Excess payments-----	77,834 39	17,620 31
-----	-----	State fees-----	588 00	69 00
-----	-----	University Fund-----	290,281 00	290,281 00
-----	-----	-----	-----	-----
-----	\$3,669,692 44	Amounts forward-----	\$2,382,972 60	-----

BALANCE

California, at Berkeley, California, June 30, 1884.

DEBIT.	DEBIT.	LEDGER ACCOUNTS.	CREDIT.	CREDIT.
Balances.	Face of Ledger.		Face of Ledger.	Balances.
	\$3,669,692 44	Amounts brought forward	\$2,382,972 60	
		State appropriations	318,148 75	\$318,148 75
		State Endowment interest	509,907 60	509,907 60
		Admission and tuition fees	2,370 00	2,370 00
	4,137 02	Rent from students' cottages	15,285 97	11,148 95
	4,284 63	State Geological Survey	4,537 85	253 22
	20,307 54	United States Endowment interest	170,933 76	150,626 22
		Seminary Land Fund	505 99	505 99
		Seminary Land Fund interest	1,009 37	1,009 37
		Forfeited Seminary land principal	2,480 00	2,480 00
		Forfeited Seminary land interest	1,097 22	1,097 22
		Forfeited Seminary land fees	19 00	19 00
		Audited demands on Controller	339,895 70	339,895 70
		D. O. Mills' endowment	87,013 35	87,013 35
		Agassiz Professorship of Oriental Languages	2,217 62	2,217 62
	1,385 50	Medal Fund (donation)	4,448 82	3,063 32
	728 88	Engineering Department Fund (donation)	751 01	22 13
\$32,669 11	98,190 88	San Francisco Savings Union	65,521 77	
36,099 22	50,152 53	Security Savings Bank	14,053 31	
	2,000 00	Land Agent of University	2,188 80	188 80
29,626 99	68,362 22	Union Savings Bank, Oakland	38,735 23	
		M. Reese Library Fund	50,000 00	50,000 00
		M. Reese Library Fund interest	18,019 43	18,019 43
19,000 00	35,342 32	Seminary Land Fund investment	16,342 32	
	4,231 74	Seminary Land Fund interest	9,695 98	5,464 24
39,500 00	50,643 33	Brayton Real Estate Fund	11,143 33	
	5,709 05	Brayton Real Estate Fund interest	16,806 18	11,097 13
5,585 60	6,980 75	Oakland Bank of Savings, Oakland	1,395 15	
		H. D. Bacon donation	25,000 00	25,000 00
22,000 00	23,937 16	Land Administration Fund	1,937 16	
	2,172 31	Land Administration Fund interest	3,806 53	1,634 22
	4,745 00	Diverted Fund interest	19,140 00	14,395 00
	1,108 75	F. L. A. Pioche donation	2,568 23	1,459 48
825 00	825 00	Agricultural Laboratory		
65,589 09	65,589 09	Bacon Library and Art Gallery Building		
20,000 00	47,992 34	Special Investment Fund	27,992 34	
	9,960 69	Special Investment Fund interest	10,538 80	578 11
	\$4,178,479 17		\$4,178,479 17	

STATEMENT OF RECEIPTS AND DISBURSEMENTS FROM ENDOWMENTS, TRUST

RECEIPTS.	
Land Fund, from sales of grant of 150,000 acres-----	\$19,181 72
Excess payments-----	1,021 78
Bills receivable, Brayton property mortgage note, paid-----	26,867 50
State fees, affixing State seal to patents-----	114 00
State Appropriations:	
To Agricultural Department-----	\$9,519 03
To Bacon Library and Art Gallery Building, furniture-----	4,072 94
To Mechanical and Mining Arts-----	1,959 50
To University Grounds and Buildings-----	11,000 00
To Viticultural Department-----	776 15
To Agricultural Laboratory-----	750 00
To Physical Laboratory-----	2,535 74
D. O. Mills Endowment interest (on \$75,000)-----	30,613 30
Michael Reese Library Fund interest (on \$50,000)-----	4,500 00
State Geological Survey, sale of mules-----	3,000 00
Mechanical and Mining Departments, sale of steam engine-----	120 00
Mechanical and Mining Departments, students' fees-----	375 00
United States Endowment, 6,000 Kern County Bonds, redeemed-----	131 75
	6,000 00
Total-----	\$91,925 00

FUNDS, AND STATE APPROPRIATIONS, FOR FISCAL YEAR ENDING JUNE 30, 1884.

DISBURSEMENTS.		
United States Endowment:		
Purchase of Tehama County Bonds, par value	\$37,000	
Purchase of Kern County Bonds, par value	15,000	
		\$52,000 00
Bacon Library and Art Gallery Building, furniture		3,859 32
Excess payments		3,796 86
State fees, paid Secretary of State for affixing State seal to patents		55 00
Mechanical and Mining Departments		2,140 65
Agricultural Department		7,362 98
Agricultural Laboratory		825 00
M. Reese Library Fund, interest, purchase of books		5,278 19
State Geological Survey, insurance on material in New York City		111 50
Mineralogical Department		86 30
Physical Laboratory		2,539 24
Viticultural Fund		866 15
University site improvements		9,468 44
Equipment and repairs		1,531 56
Union Savings Bank, deposit, Brayton Property Fund		8,955 50
Security Savings Bank, deposit, Brayton Property Fund		8,956 50
San Francisco Savings Union, deposit, Brayton Property Fund		8,955 50
Total		\$116,788 69

STATEMENT OF RECEIPTS AND DISBURSEMENTS FROM INCOME AVAILABLE FOR

RECEIPTS.	
Interest and discount—Interest on Brayton property, mortgage notes	\$2,735 0
Interest from Brayton Real Estate Fund, investment in bonds	4,637 7
Interest from balance of unpaid principal, due agricultural grant	10,140 0
Interest from United States Endowment, investment in bonds	20,172 2
Interest from Seminary Land Investment Fund, invested in bonds	2,059 2
Interest from State Endowment Fund, from sales of tide lands	50,021 2
Interest from Diverted Funds	4,785 0
Interest from Land Administration Fund, investment in bonds	994 8
Interest from Land Administration Fund, on Marin County Bonds	1,189 2
Interest from Special Investment Fund	4,416 3
Land Administration, fees returned	6 7
University Site Improvements, rent of mountain land	100 0
Agricultural Department, sale of fruit	36 9
Physical Laboratory, students' fees	115 4
College celebrations, diplomas	302 8
Laboratory, from students	950 0
Land fees for issuance of approvals, certificate of purchase, and patents	1,114 4
Admission and tuition fees	200 0
Cottage rents	1,276 0
Equipment and repairs, sale of gas machine	100 0
Total	\$105,353

RECAPITULATION OF STATEMENTS.	
Cash receipts from endowments, trust funds, and State appropriations	\$91,925 08
Cash receipts from income available for current expenses	105,353 39
Cash balance with Treasurer D. O. Mills June 30, 1883	63,989 05
	\$261,267 2
Cash disbursements on account of endowments, trust funds, and State appropriations	\$116,788 69
Cash disbursements on account of current expenses	91,738 73
Cash balance with Treasurer James C. Flood June 30, 1884	52,740 10
	\$261,267 2

THE PAYMENT OF CURRENT EXPENSES FOR FISCAL YEAR ENDING JUNE 30, 1884.

DISBURSEMENTS.

Salaries—Educational	\$65,119 92	
Salaries—Attorneys, Secretaries, Land Agents, and Janitors	12,342 00	
Equipment and repairs		\$77,461 92
Fuel		1,297 91
Advertising and printing		478 75
Telegraphing and expressing		703 10
Stationery		210 35
Postage		77 68
University Printing Office (material)		209 05
Land administration		221 99
Incidental expenses		1,992 69
University site improvements		1,234 91
University Water Company		3,172 44
Physical Laboratory		100 17
Insurance		118 93
College celebrations		300 65
Official and lecturing expenses		252 10
Museum		241 86
Chemical Laboratory		57 71
Library		3,138 67
Military Department		339 85
Students' cottages		111 90
Total		16 10
		\$91,738 73

REPORT OF THE LAND AGENT OF THE UNIVERSITY OF CALIFORNIA.

<i>Receipts for the fiscal year ending June 30, 1883.</i>		
From sales of the Agricultural grant of 150,000 acres-----	\$67,863 22	
Less cancellation for want of title-----	1,310 00	
		\$66,553 22
From collections of \$1 25 per acre due United States on double minimum land----		3,999 13
From interest on deferred payments due Agricultural Grant-----		13,698 51
From fees for applications, certificates of purchase, and patents-----		1,347 00
From State fees due Secretary of State for affixing State seal to patents-----		67 00
		\$85,664 86
Total cash receipts-----		
Number of acres for which certificates of purchase have issued-----		6,945.45
Number of acres for which patents have been issued for minimum land-----		4,337.00
Number of acres for which patents have been issued for double minimum land----		5,379.50
<i>Receipts for the fiscal year ending June 30, 1884.</i>		
From sales of the Agricultural Grant of 150,000 acres-----	\$20,510 59	
Less cancellation for want of title-----	1,328 87	
		\$19,181 72
From collections of \$1 25 per acre due the United States on double minimum land----		1,014 40
From interest on deferred payments due Agricultural Grant-----		10,768 50
From fees for applications, certificates of purchase, and patents-----		1,114 00
From State fees due Secretary of State for affixing State seal to patents-----		114 00
		\$32,192 62
Total cash receipts-----		
Number of acres for which certificates of purchase have been issued-----		4,677.70
Number of acres for which patents have been issued for minimum land-----		3,807.90
Number of acres for which patents have been issued for double minimum land----		6,893.00
Total sales of the Agricultural Grant to June 30, 1884-----	\$553,231	
Total interest received on deferred payments-----	268,455	
Total fees-----	13,181	

STATEMENT OF LANDS LISTED AND CHARGED AGAINST THE AGRICULTURAL GRANT OF 150,000 ACRES TO JUNE 30, 1884.

DISTRICTS.	Number Acres.
San Francisco District-----	48,779.80
Sacramento District-----	6,360.00
Los Angeles District-----	8,038.60
Humboldt District-----	13,687.80
Shasta District-----	17,341.00
Stockton District-----	9,450.00
Visalia District-----	12,258.20
Marysville District-----	21,710.00
Susanville District-----	1,177.00
Aurora District-----	1,920.00
Independence or Bodie District-----	1,440.00
Total acres listed-----	142,160.00

The records of this office show the following number of acres listed against the Seminary and Public Building Land Grants:

Seminary Lands.

arysville District.....	25,287.24 acres
ramento District (536.09 acres sold, but not listed).....	400.00 acres
salia District (320 acres sold, but not listed).....	640.00 acres
umboldt District (2,000 acres sold, but not listed).....	6,602.36 acres
umboldt District (480 acres forfeited to Regents, but not listed).....	
ockton District.....	5,120.00 acres
n Francisco District (1,924.66 acres sold, but not listed).....	1,724.51 acres
Total listed.....	39,774.11 acres
Sold, but not listed.....	5,261.75 acres
	45,035.86 acres

Total number of acres of grant, 46,080; leaving yet to be applied for, 1,044.14 acres.

Public Building Lands.

umboldt District.....	1,283.80 acres
salia District.....	1,294.24 acres
ockton District (640.78 acres sold, but not listed).....	1,582.85 acres
n Francisco District (320 acres sold, but not listed).—None listed.	
arysville District.....	800.00 acres
Total acres listed.....	4,960.79 acres
Sold, but not listed.....	960.78 acres
	5,921.57 acres

Total number of acres of grant, 6,400; leaving yet to be applied for, 478.43 acres.



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